COLLECTED WORKS OF JOHN STUART MILL

VOLUME VIII

A System of Logic Ratiocinative and Inductive

Being a Connected View of the Principles of Evidence and the Methods of Scientific Investigation

by JOHN STUART MILL

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BOOKS IV–VI AND APPENDICES

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A SYSTEM OF LOGIC

RATIOCINATIVE AND INDUCTIVE

BOOK IV

OF OPERATIONS SUBSIDIARY TO INDUCTION

"Clear and distinct ideas are terms which, though familiar and frequent in men's mouths, I have reason to think every one who uses does not perfectly understand. And possibly it is but here and there one who gives himself the trouble to consider them so far as to know what he himself or others precisely mean by them; I have, therefore, in most places, chose to put determinate or determined, instead of clear and distinct, as more likely to direct men's thoughts to my meaning in this matter." Locke's *Essay on the Human Understanding*; "Epistle to the Reader" [pp. liii–liv].

[a]"Il ne peut y avoir qu'une méthode parfaite, qui est la *méthode naturelle*; on nomme ainsi un arrangement dans lequel les êtres du même genre seraient plus voisins entre eux que de ceux de tous les autres genres; les genres du même ordre, plus que de ceux de tous les autres ordres; et ainsi de suite. Cette méthode est l'idéal auquel l'histoire naturelle doit tendre; car il est évident que si l'on y parvenait, l'on aurait l'expression exacte et complète de la nature entière." Cuvier, *Règne Animal*, Introduction [pp. 11–12].[a]

[b]"Deux grandes notions philosophiques dominent la théorie fondamentale de la méthode naturelle proprement dite, savoir la formation des groupes naturels, et ensuite leur succession hiérarchique." Comte, *Cours de Philosophie Positive*, 42me leçon [Vol. III, p. 546].[b]

[a–a]MS, 43 "According to this view of the process of the mind, in carrying on general speculations, that Idea which the ancient philosophers considered as the essence of an individual, is nothing more than the particular quality or qualities in which it resembles other individuals of the same class; and in consequence of which, a generic name is applied to it." D. Stewart, [*Elements of the*] *Philosophy of the Human Mind*, [Vol. I, p. 172,] Chap. iv, sect. 2.

[b–b]+MS, 43, 62, 65, 68, 72

CHAPTER I

Of Observation and Description

§ 1. [*Observation, how far a subject of logic*] The inquiry which occupied us in the two preceding books, has conducted us to what appears a satisfactory solution of the principal problem of Logic, according to the conception I have formed of the science. We have found, that the mental process with which Logic is conversant, the operation of [a]ascertaining[a] truths by means of evidence, is always, even when appearances point to a different theory of it, a process of induction. And we have particularized the various modes of induction, and obtained a clear view of the principles to which it must conform, in order to lead to results which can be relied on.

The consideration of Induction, however, does not end with the direct rules for its performance. Something must be said of those other operations of the mind, which are either necessarily presupposed in all induction, or are instrumental to the more difficult and complicated inductive processes. The present book will be devoted to the consideration of these subsidiary operations: among which our attention must first be given to those, which are indispensable preliminaries to all induction whatsoever.

Induction being merely the extension to a class of cases, of something which has been observed to be true in certain individual instances of the class; the first place among the operations subsidiary to induction, is claimed by Observation. This is not, however, the place to lay down rules for making good observers; nor is it within the competence of Logic to do so, but of the art of intellectual Education. Our business with observation is only in its connexion with the appropriate problem of logic, the estimation of evidence. We have to consider, not how or what to observe, but under what conditions observation is to be relied on; what is needful, in order that the fact, supposed to be observed, may safely be received as true.

§ 2. [*A great part of what seems observation is really inference*] The answer to this question is very simple, at least in its first aspect. The sole condition is, that what is supposed to have been observed shall really have been observed; that it be an observation, not an inference. For in almost every act of our perceiving faculties, observation and inference are intimately

[a-a]MS, 43, 46, 51 investigating

blended. What we are said to observe is usually a compound result, of which one-tenth may be observation, and the remaining nine-tenths inference.

I affirm, for example, that I hear a man's voice. This would pass, in common language, for a direct perception. All, however, which is really perception, is that I hear a sound. That the sound is a voice, and that voice the voice of a man, are not perceptions but inferences. I affirm, again, that I saw my brother at [a]a certain hour[a] this morning. If any proposition concerning a matter of fact would [b]commonly[b] be said to be known by the direct testimony of the senses, this surely would be so. The truth, however, is far otherwise. I only saw a certain coloured surface; or rather I had the kind of visual sensations which are usually produced by a coloured surface; and from these as marks, known to be such by previous experience, I concluded that I saw my brother. I might have had sensations precisely similar, when my brother was not there. I might have seen some other person so nearly resembling him in appearance, as, at the distance, and, with the degree of attention which I bestowed, to be mistaken for him. I might have been asleep, and have dreamed that I saw him; or in a state of nervous disorder, which brought his image before me in a waking hallucination. In all these modes, [c]many[c] have been led to believe that they saw persons well known to them, who were dead or far distant. If any of these suppositions had been true, the affirmation that I saw my brother would have been erroneous; but whatever was matter of direct perception, namely the visual sensations, would have been real. The inference only would have been ill grounded; I should have ascribed those sensations to a wrong cause.

Innumerable instances might be given, and analysed in the same manner, of what are vulgarly called errors of sense. There are none of them properly errors of sense; they are erroneous inferences from sense. When I look at a candle through a multiplying glass, I [d]see what seems[d] a dozen candles instead of one: and if the real circumstances of the case were skilfully disguised, I might suppose that there were really that number; there would be what is called an optical deception. In the kaleidoscope there really is that deception: when I look through the instrument, instead of what is actually there, namely a casual arrangement of coloured fragments [e], the appearance presented is that of[e] the same combination several times repeated in symmetrical arrangement round a point. The delusion is of course effected by giving me the same sensations which I should have had if such a symmetrical combination had really been presented to me. If I cross two of my fingers, and bring any small object, a marble for instance, into contact with both, at points not usually touched simultaneously by one object, I can hardly, if my

[a-a]MS ten o'clock
[b-b]+43, 46, 51, 56, 62, 65, 68, 72
[c-c]MS, 43, 46 men
[d-d]MS, 43, 46 seem to see
[e-e]MS, 43, 46 of glass, I seem to see

eyes are shut, help believing that there are two marbles instead of one. But it is not my touch in this case, nor my sight in the other, which is deceived; the deception, whether durable or only momentary, is in my judgment. From my senses I have only the sensations, and those are genuine. Being accustomed to have those or similar sensations when, and only when, a certain arrangement of outward objects is present to my organs, I have the habit of instantly, when I experience the sensations, inferring the existence of that state of outward things. This habit has become so powerful, that the inference, performed with the speed and certainty of an instinct, is confounded with [f] intuitive perceptions. When it is correct, I am unconscious that it ever needed proof; even when I know it to be incorrect, I cannot without considerable effort abstain from making it. In order to be aware that it is not made by instinct but by an acquired habit, I am obliged to reflect on the slow process [g]through[g] which I learnt to judge by the eye of many things which I now appear to perceive directly by sight; and on the reverse operation performed by persons learning to draw, who with difficulty and labour divest themselves of their acquired perceptions, and learn afresh to see things as they appear to the eye [h].

It would be easy to prolong these illustrations, were there any need to expatiate on a topic so copiously exemplified in various popular works. From the examples already given, it is seen sufficiently, that the individual facts from which we collect our inductive generalizations are scarcely ever obtained by observation alone. Observation extends only to the sensations by which we recognise objects; but the propositions which we make use of, either in science or in common life, relate mostly to the objects themselves. In every act of what is called observation, there is at least one inference—from the sensations to the presence of the object; from the marks or diagnostics, to the entire phenomenon. And hence, among other consequences, follows the seeming paradox, that a general proposition collected from particulars is often more certainly true than any one of the particular propositions from which, by an act of induction, it was inferred. For, each of those particular (or rather singular) propositions involved an inference, from the impression on the senses to the fact which caused that impression: and this inference may have been erroneous in any one of the instances, but cannot well have been erroneous in all of them, provided their number was sufficient to eliminate chance. The conclusion, therefore, that is, the general proposition, may deserve more complete reliance than it would be safe to repose in any one of the inductive premises.

The logic of observation, then, consists solely in a correct discrimination

[f]MS my
[g-g]MS, 43 by
[h]MS, 43, 46 , instead of seeing them as they really are

between that, in a result of observation, which has really been perceived, and that which is an inference from the perception. Whatever portion is inference, is amenable to the rules of induction already treated of, and requires no further notice here: the question for us in this place is, when all which is inference is taken away, what remains. There [i]remains[i], in the first place, the mind's own feelings or states of consciousness, namely, its outward feelings or sensations, and its inward feelings—its thoughts, emotions, and volitions. Whether anything else remains, or all else is inference from this; whether the mind is capable of directly perceiving or apprehending anything except states of its own consciousness—is [j]a problem of metaphysics not to be discussed in this place[j]. But after excluding all questions on which metaphysicians differ, it remains true, that for most purposes the discrimination we are called upon practically to exercise is [k]that[k] between sensations or other feelings, of our own or of other people, and inferences drawn from them. And on the theory of Observation this is all which seems necessary to be said [l]for the purposes of the present work[l].

§ 3. [*The description of an observation affirms more than is contained in the observation*] If, in the simplest observation, or in what passes for such, there is a large part which is not observation but something else; so in the simplest description of an observation, there is, and must always be, much more asserted than is contained in the perception itself. We cannot describe a fact, without implying more than the fact. The perception is only of one individual thing; but to describe it is to affirm a connexion between it and every other thing which is either denoted or connoted by any of the terms used. To begin with an example, than which none can be conceived more elementary: I have a sensation of sight, and I endeavour to describe it by saying that I see something white. In saying this, I do not solely affirm my sensation; I also class it. I assert a resemblance between the thing I see, and all things which I and others are accustomed to call white. I assert that it resembles them in the circumstance in which they all resemble one another, in that which is the ground of their being called by the name. This is not merely one way of describing an observation, but the only way. If I would either register my observation for my own future use, or make it known for the benefit of others, I must assert a resemblance between the fact which I have observed and something else. It is inherent in a description, to be the statement of a resemblance, or resemblances.

[i-i]MS, 43, 46, 51, 56, 62 remain
[j-j]MS, 43, 46 the peculiar problem of the higher or transcendental metaphysics
[k-k]+62, 65, 68, 72
[l-l]MS, 43, 46 in this place

[a]We thus see that it is impossible to express in words any result of observation, without performing an act possessing what Dr. Whewell considers to be characteristic of Induction. There is always something introduced which was not included in the observation itself; some conception common to the phenomenon with other phenomena to which it is compared. An observation cannot be spoken of in language at all without declaring more than that one observation; without assimiliating it to other phenomena already observed and classified. But this identification of an object—this recognition of it as possessing certain known characteristics—has never been confounded with Induction. It is an operation which precedes all induction, and supplies it with its materials. It is a perception of resemblances, obtained by comparison.[a]

These resemblances are not always apprehended directly, by merely comparing the object observed with some other present object, or with our recollection of an object which is absent. They are often ascertained through intermediate marks, that is, deductively. In describing some new kind of animal, suppose me to say that it measures ten feet in length, from the forehead to the extremity of the tail. I did not ascertain this by the unassisted eye. I had a two foot rule which I applied to the object, and, as we commonly say, measured it; an operation which was not wholly manual, but partly also mathematical, involving the two propositions, Five times two is ten, and Things which are equal to the same thing are equal to one another. Hence, the fact that the animal is ten feet long [b]is[b] not an immediate perception, but a conclusion from reasoning; the minor premises alone being furnished by observation of the object. [c]Nevertheless, this is called an observation, or a description of the animal, not an induction respecting it.[c]

To pass at once from a very simple to a very complex example: I affirm that the earth is globular. The assertion is not grounded on direct perception; for the figure of the earth cannot, by us, be directly perceived, though the assertion would not be true unless circumstances could be supposed under which its truth could be so perceived. That the form of the earth is globular is inferred from certain marks, as for instance from this, that its shadow thrown upon the moon is circular; or this, that on the sea, or any extensive plain, our horizon is always a circle; either of which marks is incompatible with any other than a globular form. I assert further, that the earth is that particular kind of globe which is termed an oblate spheroid; because it is found by measurement in the direction of the meridian, that the length on the surface of the earth which subtends a given angle at its centre, diminishes

[a-a]+56, 62, 65, 68, 72
[b-b]MS was
[c-c]MS, 43, 46, 51 But this does not hinder it from being rightly called a description of the animal.

as we recede from the equator and approach the poles. But these propositions, that the earth is globular, and that it is an oblate spheroid, assert, each of them, [d]an[d] individual fact; in its own nature capable of being perceived by the senses when the requisite organs and the necessary position are supposed, and only not actually perceived because [e]those[e] organs and that position are wanting. [f]This identification of the earth, first as a globe, and next as an oblate spheroid,[f] which, if the fact could have been seen, would have been called a description of the figure of the earth, may without impropriety be so called when, instead of being seen, it is inferred. But we could not without impropriety call either of these assertions an induction from facts respecting the earth. They are not general propositions collected from particular facts, but particular facts deduced from general propositions. They are conclusions obtained deductively, from premises originating in induction: but of these premises some were not obtained by observation of the earth, nor had any peculiar reference to it.

If, then, the truth respecting the figure of the earth is not an induction, why should the truth respecting the figure of the earth's orbit be so? [g]The[g] two cases only differ in this, that the form of the orbit was not, like the form of the earth itself, deduced by ratiocination from facts which were marks of ellipticity, but was got at by boldly guessing that the path was an ellipse, and finding afterwards, on examination, that the observations were in harmony with the hypothesis. [h]According to Dr. Whewell, however, this process of guessing and verifying our guesses is not only induction, but[h] the whole of induction: no other exposition can be given of that logical operation.[*] That he is wrong in the latter assertion, the whole of the preceding book has, I hope, sufficiently proved; and that [i]the process by which the ellipticity of the planetary orbits was ascertained, is not induction at all[i], was attempted to be shown in the second chapter of the same book.* We are now, however, prepared to go more into the heart of the [j]matter[j] than at that earlier period of our inquiry, and [k]to show, not merely what the operation in question is not, but what it is[k].

[*See *Novum Organon Renovatum*, pp. 64, 72ff.]
*Supra, Bk. III, Chap. ii, §§3, 4, 5 [pp. 292–305].

[d-d]MS, 43, 46, 51 one
[e-e]43, 46 these [*printer's error?*]
[f-f]MS, 43, 46, 51 That
[g-g]MS, 43 Mr. Whewell contends that it is; although the
[h-h]MS, 43 Not only, according to Mr. Whewell, is this process of guessing and verifying our guesses induction, but it is
[i-i]MS, 43, 46 even the former of the two contains a large dose of error with but a small portion of truth
[j-j]MS, 43, 46 question
[k-k]MS, 43, 46 a few words will, I think, suffice to dispel all remaining obscurity

§ 4. [*The description of an observation affirms, beyond what is contained in the observation, an agreement among phenomena; and* [a]*the*[a] *comparison of phenomena to ascertain such agreements is a preliminary to induction*] We observed, in the second chapter,[*] that the proposition "the earth moves in an ellipse," so far as it only serves for the colligation or connecting together of actual observations, (that is, as it only affirms that the observed positions of the earth may be correctly represented by as many points in the circumference of an imaginary ellipse,) is not an induction, but a description: it is an induction, only when it affirms that the intermediate positions, of which there has been no direct observation, would be found to correspond to the remaining points of the same elliptic circumference. Now, though this real induction is one thing, and the description another, we are in a very different condition for making the induction [b]before we have obtained the description, and after[b] it. For [c]inasmuch as[c] the description, like all other descriptions, contains the assertion of a resemblance between the phenomenon described and something else; in pointing out something which the series of observed places of a planet resembles, it points out something in which the several places themselves agree. If the series of places [d]correspond[d] to as many points of an ellipse, the places themselves agree in being situated in that ellipse. We have, therefore, by [e]the same process which gave us[e] the description, obtained the requisites for an induction by the Method of Agreement. The successive observed places of the earth being considered as effects, and its motion as the cause which produces them, we find that those effects, that is, those places, agree in the circumstance of being in an ellipse. We conclude that the remaining effects, the places which have not been observed, agree in the same circumstance, and that the *law* of the motion of the earth is motion in an ellipse.

The Colligation of Facts, therefore, by means of hypotheses, or, as Dr. Whewell prefers to say, by means of Conceptions,[†] instead of being, as he supposes, Induction itself, takes its proper place among operations subsidiary to Induction. All Induction supposes that we have previously compared the requisite number of individual instances, and ascertained in what circumstances they agree. The Colligation of Facts is no other than this preliminary operation [f]. When Kepler, after vainly endeavouring to connect the observed

[*Of Bk. III.]
[†See *Novum Organon Renovatum*, pp. 59ff.]

[a-a]+43, 46, 51, 56, 62, 65, 68, 72
[b-b]MS, 43, 46, 51, 56 after we . . . and before
[c-c]MS since
[d-d]MS, 43 corresponds
[e-e]MS, 43, 46 means of
[f]MS, 43 : and the proper office of "clear and appropriate ideas," on the necessity of which Mr. Whewell has said so much, is to enable us to perform this operation correctly

places of a planet by various hypotheses of circular motion, at last tried the hypothesis of an ellipse and found it answer to the phenomena; what he really attempted, first unsuccessfully and at last successfully, was to discover the circumstance in which all the observed positions of the planet agreed. And when he in like manner connected another set of observed facts, the periodic times of the different planets, by the proposition that the squares of the times are proportional to the cubes of the distances, what he did was simply to ascertain the property in which the periodic times of all the different planets agreed.

Since, therefore, all that is true and to the purpose in Dr. Whewell's doctrine of Conceptions might be fully expressed by the more familiar term Hypothesis; and since his Colligation of Facts by means of appropriate Conceptions, is but the ordinary process of finding by a comparison of phenomena, in what consists their agreement or resemblance; I would willingly have confined myself to those better understood expressions, and persevered to the end in the same abstinence which I have hitherto observed from [g] ideological discussions; considering the mechanism of our thoughts to be a topic distinct from and irrelevant to the principles and rules by which the trustworthiness of the results of thinking is to be estimated. Since, however, a work of such high pretensions, and, it must also be said, of so much real merit, has rested the whole theory of Induction upon such ideological considerations, it seems necessary for others who [h]follow[h], to claim for themselves and their doctrines whatever position may properly belong to them on the same metaphysical ground. And this is the object of the succeeding chapter.

[g]MS, 43, 46 all
[h-h]MS come after

CHAPTER II

Of Abstraction, or the Formation of Conceptions

§ 1. [*The comparison which is a preliminary to induction implies general conceptions*] The metaphysical inquiry into the nature and composition of what have been called Abstract Ideas, or in other words, of the notions which answer in the mind to classes and to general names, belongs not to Lògic, but to a different science, and our purpose does not require that we should enter upon it here. We are only concerned with the universally acknowledged fact, that such [a] notions or conceptions do exist. The mind can conceive a multitude of individual things as one assemblage or class; and general names do [b]really[b] suggest to us certain ideas or mental representations, otherwise we could not use the names with consciousness of a meaning. Whether the idea called up by a general name is composed of the various circumstances in which all the individuals denoted by the name agree, and of no others, (which is the doctrine of Locke, Brown, and the Conceptualists;) or whether it be the idea of some one of those individuals, clothed in its individualizing peculiarities, but with the accompanying knowledge that those peculiarities are not properties of the class, (which is the doctrine of Berkeley, [c]Mr. Bailey,*[c] and the modern Nominalists;) or whether (as held by Mr. [e]James[e] Mill) the idea of the class is that of a miscellaneous assemblage of individuals belonging

*[62] Mr. Bailey has given [d] the best statement of this theory. "The general name," he says, "raises up the image sometimes of one individual of the class formerly seen, sometimes of another, not unfrequently of many individuals in succession; and it sometimes suggests an image made up of elements from several different objects, by a latent process of which I am not conscious." (*Letters on the Philosophy of the Human Mind*, 1st series, letter 22 [pp. 189–91].) But Mr. Bailey must allow that we carry on inductions and ratiocinations respecting the class, by means of this idea or conception of some one individual in it. This is all I require. The name of a class calls up some idea, through which we can, to all intents and purposes, think of the class as such, and not solely of an individual member of it.

[a]MS, 43, 46, 51, 56 general
[b–b]+43, 46, 51, 56, 62, 65, 68, 72
[c–c]MS, 43, 46, 51, 56 Dugald Stewart,
[d]62, 65, 68 by far
[e–e]+68, 72

to the class;[*] or whether, finally, [f] it be any one or any other of all these, according to the accidental circumstances of the case; certain it is, that *some* idea or mental conception is suggested by a general name, whenever we either hear it or employ it with consciousness of a meaning. And this, which we may call if we please a general idea, *represents* in our minds the whole class of things to which the name is applied. Whenever we think or reason concerning the class, we do so by means of this idea. And the voluntary power which the mind has, of attending to one part of what is present to it at any moment, and neglecting another part, enables us to keep our reasonings and conclusions respecting the class unaffected by anything in the idea or mental image which is not really, or at least which we do not really believe to be, common to the whole class.*

[g]There are, then,[g] such things as general conceptions, [h]or conceptions by means of which we can think generally:[h] and [i] when we form a set of phenomena into a class, that is, when we compare them with one another to ascertain in what they agree, some general conception is implied in this mental operation. And inasmuch as such a comparison is a necessary preliminary to Induction, it is most true that Induction could not go on without general conceptions.

§ 2. [*But these general conceptions need not be pre-existent*] But it does not therefore follow that these general conceptions must have existed in the mind previously to the comparison. It is not [a] a law of our intellect, that in comparing things with each other and taking note of their agreement we merely recognise as realized in the outward world something that we already had in our minds. The conception originally found its way to us as the *result* of such a comparison. It was obtained (in metaphysical phrase) by *abstraction* from individual things. These things may be things which we perceived

[**Analysis*, Vol. I, pp. 210ff.]

*[65] I have entered rather fully into this question in Chap. xvii of *An Examination of Sir William Hamilton's Philosophy*, headed "The Doctrine of Concepts or General Notions," which contains my last views on the subject.

[f]MS, 43, 46, 51, 56, 62, 65, 68 (what appears to be the truest opinion,)

[g-g]MS, 43, 46 We have, then, general conceptions: we can conceive a class as a class. But this appears to me to be a fact which Logic, as such, may fairly be permitted to take for granted, without any particular examination into the manner of it. Logic is concerned with what we can know, and with what we can assert, but not with what we can conceive. We can speak and reason of a number of objects as a class, and we can know them to be a class, and know what makes them so; and it is enough for Logic to understand this, and to know that the mind has whatever powers this implies, without inquiring what powers these are. However, if we are forced to enter upon this foreign ground, it cannot but be admitted that there are

[h-h]+62, 65, 68, 72

[i]MS, 43, 46 that

[a]MS, 43 (as Mr. Whewell seems to suppose,)

or thought of on former occasions, but they may also be the things which we are perceiving or thinking of on the very occasion. When Kepler compared the observed places of the planet Mars, and found that they agreed in being points of an elliptic circumference, he applied a general conception which was already in his mind, [b]having been[b] derived from his former experience. But this is by no means [c]universally the[c] case. When we compare several objects and find them to agree in being white, or when we compare the various species of ruminating animals and find them [d]to[d] agree in being cloven-footed, we have just as much a general conception in our minds as Kepler had in his: we have the conception of "a white thing," or the conception of "[e]a cloven-footed[e] animal." But no one supposes that we necessarily bring these conceptions with us, and *superinduce* them (to adopt Dr. Whewell's expression [f])[*] upon the facts: because in these simple cases everybody sees that the very act of comparison which ends in our connecting the facts by means of the conception, may be the source from which we derive the conception itself. If we had never seen any white object or had never seen any cloven-footed animal before, we should at the same time and by the same mental act acquire the idea, and employ it for the colligation of the observed phenomena. Kepler, on the contrary, really had to bring the idea with him, and [g]superinduce[g] it upon the facts; he could not evolve it out of them: if he had not already had the idea, he would not have been able to acquire it by a comparison of the planet's positions. But this inability was a mere accident: the idea of an ellipse could have been acquired from the paths of the planets as effectually as from anything else, if the paths had not happened to be invisible. If the planet had left a visible track, and we had been so placed that we could see it at the proper angle, we might have abstracted our original idea of an ellipse from the planetary orbit. Indeed, every conception which can be made the instrument for connecting a set of facts, might have been originally evolved from those very facts. The conception is a conception *of* something; and that which it is a conception of, is really *in* the facts, and might, under some supposable circumstances, or by some supposable extension of the faculties which we actually possess, have been detected in them. And not only is this always in itself possible, but it actually happens in almost all cases in which the obtaining of the right conception is a matter of any considerable difficulty. For if there be no new conception required; if one of those already familiar to mankind will serve the purpose, the accident

[*See *Novum Organon Renovatum*, p. 71 (Bk. II, Chap. v, Aphorism XV).]

[b-b]+43, 46, 51, 56, 62, 65, 68, 72
[c-c]MS, 43, 46 the universal
[d-d]+68, 72
[e-e]51, 56, 62 cloven-footed [*printer's error?*]
[f]MS, 43, 46, 51, 56 [*footnote:*] **Philosophy of the Inductive Sciences*, Vol. I, p. 42.
[g-g]MS "superinduce"

of being the first to whom the right one occurs, may happen to almost anybody; at least in the case of a set of phenomena which the whole scientific world are engaged in attempting to connect. The honour, in Kepler's case, was that of the accurate, patient, and toilsome calculations by which he compared the results that followed from his different guesses, with the observations of Tycho Brahe; but the merit was very small of guessing an ellipse; the only wonder is that men had not guessed it before, nor could they have failed to do so if there had not existed an obstinate *à priori* prejudice that the heavenly bodies must move, if not in a circle, in some combination of circles.

The really difficult cases are those in which the conception [h]destined[h] to create light and order out of darkness and confusion, has to be sought for among the very phenomena which it afterwards serves to arrange. Why, according to Dr. Whewell himself, did the ancients fail in discovering the laws of mechanics, that is, of equilibrium and of the communication of motion? Because they had not, or at least had not clearly, the ideas or conceptions of pressure and resistance, momentum, and uniform and accelerating force.[*] And whence could they have obtained these ideas except from the very facts of equilibrium and motion? The tardy development of several of the physical sciences, for example of optics, electricity, magnetism, and the higher generalizations of chemistry, [i]he[i] ascribes to the fact that mankind had not yet possessed themselves of the Idea of Polarity, that is, the idea of opposite properties in opposite directions. But what was there to suggest such an idea, until, by a separate examination of several of these different branches of knowledge, it was shown that the facts of each of them did present, in some instances at least, the curious phenomenon of opposite properties in opposite directions? The thing was superficially manifest only in two cases, those of the magnet and of electrified bodies; and there the conception was encumbered with the circumstance of material poles, or fixed points in the body itself, in which points this opposition of properties seemed to be inherent. The first comparison and abstraction had led only to this conception of poles; and if anything corresponding to that conception had existed in the phenomena of chemistry or optics, the difficulty [j]now justly considered[j] so great, would have been extremely small. The obscurity [k]arose[k] from the fact, that the polarities in chemistry and optics were distinct species, though of the same genus, with the polarities in electricity and magnetism: and that in order to assimilate the phenomena to one another, it was necessary to compare a polarity without poles, such [l]for instance as is exemplified[l] in

[*See *History of the Inductive Sciences*, 1st ed., Vol. I, p. 34.]

[h-h]MS, 43, 46 , that is
[i-i]MS, 43 Mr. Whewell
[j-j]MS, 43 which Mr. Whewell justly considers as
[k-k]65, 68 rose
[l-l]MS as is exemplified, for instance,

the polarization of light, and the polarity with [m](apparent)[m] poles, which we see in the magnet; and to recognise that these polarities, while different in many other respects, agree in the one character which is expressed by the phrase, opposite properties in opposite directions. From the result of such a comparison it was that the minds of scientific men formed this new general conception: between which, and the first confused feeling of an analogy between some of the phenomena of light and those of electricity and magnetism, there is a long interval, filled up by the labours and more or less sagacious suggestions of many superior minds.

The conceptions, then, which we employ for the colligation and methodization of facts, do not develop themselves from within, but are impressed upon the mind from without; they are never obtained otherwise than by way of comparison and abstraction, and, in the most important and the most numerous cases, are evolved by abstraction from the very phenomena which it is their office to colligate. I am far [n], however,[n] from wishing to imply that it is not often a very difficult thing to perform this process of abstraction well, or that the success of [o]an[o] inductive operation does not, in many cases, principally depend on the skill with which we perform it. Bacon [p]was quite justified in designating[p] as one of the principal obstacles to good induction, general conceptions wrongly formed, "notiones temerè à rebus abstractæ:" to which Dr. Whewell adds, that not only does bad abstraction make bad induction, but that in order to perform induction well, we must have abstracted well; our general conceptions must be "clear" and "appropriate" to the matter in hand.[*] [q]

§ 3. [*A general conception, originally the result of a comparison, becomes itself the type of comparison*] In attempting to show what the difficulty in this matter really is, and how it is surmounted, I must beg the reader, once for all, to bear this in mind; that although, in discussing [a]the opinions of a different school of philosophy, I am willing to adopt their[a] language, and to speak, therefore, of connecting facts through the instrumentality of a conception, this technical phraseology means neither more nor less than what is commonly called comparing the facts with one another and determining in what they agree. Nor has the technical expression even the advantage of being

[*Bacon, *Novum Organum*, Bk. I, Aph. 14, p. 158; Whewell, *Novum Organon Renovatum*, p. 41.]

[m-m]+62, 65, 68, 72 [n-n]+62, 65, 68, 72
[o-o]MS our
[p-p]MS, 43, 46, 51, 56 , in his forcible manner, designated
[q]MS, 43 Nor can it be doubted that, in what they thus said, both Bacon and Mr. Whewell, though they expressed their meaning vaguely, had a meaning, and a highly important one.] 46, 51, 56 *as* MS . . . said, these philosophers, though . . . *as* MS
[a-a]MS, 43 Mr. Whewell's opinions I am willing to adopt his

metaphysically correct. The facts are not *connected* [b], except in a merely metaphorical acceptation of the term[b]. The *ideas* of the facts may become connected, that is, we may be led to think of them together; but this consequence is no more than what may be produced by any casual association. What really takes place, is, I conceive, more philosophically expressed by the common word Comparison, than by the phrases "to connect" or "to superinduce." For, as the general conception is itself obtained by a comparison of particular phenomena, so, when obtained, the mode in which we apply it to other phenomena is again by comparison. We compare phenomena with each other to get the conception, and we then compare those and other phenomena *with* the conception. We get the conception of an animal (for instance) by comparing different animals, and when we afterwards see a creature resembling an animal, we compare it with our general conception of an animal; and if it agrees with that general conception, we include it in the class. The conception becomes the type of comparison.

And we need only consider what comparison is, to see that where the objects are more than two, and still more when they are an indefinite number, a type of some sort is an indispensable condition of the comparison. When we have to arrange and classify a great number of objects according to their agreements and differences, we do not make a confused attempt to compare all with all. We know that two things are as much as the [c]mind can easily[c] attend to at a time, and we therefore fix upon one of the objects, either at hazard or because it offers in a peculiarly striking manner some important character, and, taking this as our standard, [d]compare it with[d] one object after another. If we find a second object which presents a remarkable agreement with the first, inducing us to class them together, the question instantly arises, in what [e]particular[e] circumstances do they agree? and to take notice of these circumstances is already a first stage of abstraction, giving rise to a general conception. Having advanced thus far, when we now take in hand a third object we naturally ask ourselves the question, not merely whether this third object agrees with the first, but whether it agrees with it in the same circumstances in which the second did? in other words, whether it agrees with the general conception [f]which has been[f] obtained by abstraction from the first and second? Thus we see the tendency of general conceptions, as soon as formed, to substitute themselves as types, for whatever individual objects previously answered that purpose in our comparisons. We may, perhaps, find that no considerable number of other objects [g]agree[g] with this first general conception; and that we must drop the conception, and beginning again with

[b-b]MS, 43, 46 ; they remain separate facts as they were before
[c-c]MS, 43, 46 human mind can
[d-d]MS, 43, 46 we compare with it] 51, 56, 62 compare with it
[e-e]+46, 51, 56, 62, 65, 68, 72
[f-f]+43, 46, 51, 56, 62, 65, 68, 72 [g-g]MS agrees

a different individual case, proceed by [h]fresh[h] comparisons to a different general conception. Sometimes, again, we find that the same conception will serve, by merely leaving out some of its circumstances; and by this higher effort of abstraction, we obtain a still more general conception; as in the case formerly referred to, [i]the scientific world[i] rose from the conception of poles to the general conception of opposite properties in opposite directions; or as those South-Sea islanders, whose conception of a quadruped had been abstracted from hogs (the only animals of that description which they had seen), when they afterwards compared that conception with other quadrupeds, dropped some of the circumstances, and arrived at the more general conception which Europeans associate with the term.

These brief remarks contain, I believe, all that is well-grounded in [j]the[j] doctrine, that the conception by which the mind arranges and gives unity to phenomena must be furnished by the mind itself, and that we find the right conception by a tentative process, trying first one and then another until we hit the mark. [k]The[k] conception is not furnished *by* the mind until it has been furnished *to* the mind; and [l] the facts which supply it are sometimes extraneous facts, but more often the very facts which we are attempting to arrange by it. It is quite true, however, that in endeavouring to arrange the facts, [m]at whatever point we begin, we never advance three[m] steps without forming a general conception, more or less distinct and precise; and that this general conception becomes the clue which we instantly endeavour to trace through the rest of the facts, or rather, [n]becomes[n] the standard with which we thenceforth compare them. If we are not satisfied with the agreements which we discover among the pehnomena by comparing them with this type, or with some still more general conception which by an additional stage of abstraction we can form from the type; we change our [o]path[o], and look out for other agreements: we recommence the comparison from a different starting point, and so generate a different set of general conceptions. This is the tentative process which Dr. Whewell speaks of; and [p]which has not unnaturally suggested[p] the theory, that the conception is supplied by the mind itself [q]: since the[q] different conceptions which the mind successively tries, it either already possessed from its previous experience, or they were supplied to it in the [r]

[h-h]MS, 43, 46, 51, 56 different
[i-i]MS, 43, 46, 51, 56, 62, 65 we
[j-j]MS, 43 Mr. Whewell's
[k-k]MS, 43 It has been seen that the
[l]MS, 43 that
[m-m]MS whatever point we begin at, we never advance two
[n-n]+43, 46, 51, 56, 62, 65, 68, 72
[o-o]MS, 43, 46, 51 course
[p-p]MS this it is which suggests] 43 this it is which suggested
[q-q]MS, 43 . The
[r]MS, 43, 46, 51 very

first stage of the corresponding act of comparison; [e]so that[e], in the subsequent part of the process, the conception manifested itself as something compared with the phenomena, not evolved from them [f].

§ 4. [*What is meant by appropriate conceptions*] If this be a correct account of the instrumentality of general conceptions in the comparison which necessarily precedes Induction, we [a]are now[a] able to translate into our own language what Dr. Whewell means by saying that conceptions, to be subservient to Induction, must be "clear" and "appropriate."

If the conception corresponds to a real agreement among the phenomena; if the comparison which we have made of a set of objects has led us to class them according to real resemblances and differences; the conception which does this [b] cannot fail to be appropriate, for some purpose or other. The question of appropriateness is relative to the particular object we have in view. As soon as, by our comparison, we have ascertained some agreement, something which can be predicated in common of a number of objects; we have obtained a basis on which an inductive process is capable of being founded. But the agreements, or the ulterior consequences to which [c]those agreements[c] lead, may be of very different degrees of importance. If, for instance, we only compare animals according to their colour, and class those together which are coloured alike, we form the general conceptions of a white animal, a black animal, &c., which are conceptions legitimately formed; and if an induction were to be attempted concerning the causes of the colours of animals, this comparison would be the proper and necessary preparation for such an induction, but would not help us towards a knowledge of the laws of any other of the properties of animals: while if, with Cuvier, we compare and class them according to the structure of the skeleton, or, with Blainville,[*] according to the nature of their outward integuments, the agreements and differences which are observable in these respects are not only of much greater importance in themselves, but are marks of agreements and differences in many other [d] important particulars of the structure and mode of life of the animals. If, therefore, the study of their structure and habits be our object, the conceptions generated by these last comparisons are far more "appropriate" than those generated by the former. Nothing, other than this, can be meant by the appropriateness of a conception.

[*See Henri Marie Ducrotay de Blainville. *De l'Organisation des animaux*. Paris: Levrault, 1822.]

[e-e]MS, 43 and since
[f]MS, 43 , Mr. Whewell's opinion, though I cannot help thinking it erroneous, is not unnatural
[a-a]MS, 43, 46, 51, 56, 62, 65, 68 shall easily be
[b]MS, 43, 46, 51, 56 may not indeed be clear, but it
[c-c]MS they
[d]MS, 43, 46 most

When Dr. Whewell says that the ancients, or the schoolmen, or any modern [e]inquirers[e], missed discovering the real law of a phenomenon because they applied to it an inappropriate instead of an appropriate conception; he can only mean that in comparing various instances of the phenomenon, to ascertain in what those instances agreed, they missed the important points of agreement; and fastened upon such as were either imaginary, and [f]not[f] agreements at all, or if real agreements, were comparatively trifling, and had no connexion with the phenomenon, the law of which was sought.

Aristotle, philosophizing on the subject of motion,[*] remarked that certain motions apparently take place spontaneously; bodies fall to the ground, flame ascends, bubbles of air rise in water, &c.: and these he called natural motions; while others not only never take place without external incitement, but even when such incitement is applied, tend spontaneously to cease; which, to distinguish them from the former, he called violent motions. Now, in comparing the so-called natural motions with one another, it appeared to Aristotle that they agreed in one circumstance, namely, that the body which moved (or seemed to move) spontaneously, was moving *towards its own place*; meaning thereby the place from whence it originally came, or the place where a great quantity of matter similar to itself was assembled. In the other class of motions, as when bodies are thrown up in the air, they are, on the contrary, moving *from* their own place. Now, this conception of a body moving towards its own place may justly be considered inappropriate; because, though it expresses a circumstance really found in some of the most familiar instances of motion apparently spontaneous, yet, first, there are many other cases of such motion, in which that circumstance is absent: the motion, for instance, of the earth and planets. Secondly, even when it is present, the motion, on closer examination, would often be seen not to be spontaneous: as, when air rises in water, it does not rise by its own nature, but is pushed up by the superior weight of the water which presses upon it. Finally, there are many cases in which the spontaneous motion takes place in the contrary direction to what the theory considers as the body's own place; for instance, when a fog rises from a lake, or when water dries up. [g]The agreement, therefore, which Aristotle selected as his principle of classification, did not extend to all cases of the phenomenon he wanted to study, spontaneous motion; while it did include cases of the absence of the phenomenon, cases of motion not spontaneous. The conception was hence[g] "inappropriate." We may add that, in the case in question, no conception would be appropriate; there is no

[*See *Physics*. 2 vols. Tr. P. H. Wicksteed and F. M. Cornford. London: Heinemann, 1929, 1934, Vol. II, p. 306 (254^b 13ff.).]

[e-e]MS, 43, 46 philosophers
[f-f]MS, 43, 46, 51, 56 no
[g-g]MS, 43, 46, 51, 56 There is, therefore, no agreement, but only a superficial semblance of agreement, which vanishes on closer inspection: and hence the conception is

agreement which runs through all the cases of spontaneous or apparently spontaneous motion [h]and no others[h]: they cannot be brought under one law: it is a case of Plurality of Causes.*

§ 5. [*And what is meant by clear conceptions*] So much for the first of Dr. Whewell's conditions, that conceptions must be appropriate. The second is, that they shall be "clear:" and let us consider what this implies. Unless the conception corresponds to a real agreement, it has a worse defect than that of not being clear: it is not applicable to the case at all. Among the phenomena, therefore, which we are attempting to connect by means of the conception, we must suppose that there really is an agreement, and that the conception is a conception of that agreement. In order, then, that [a]it may[a] be clear, the only requisite is, that we shall know exactly in what the agreement consists; that it shall have been carefully observed, and accurately remembered. We are said not to have a clear conception of the resemblance among a set of objects, when we have only a general feeling that they resemble, without having analysed their resemblance, or perceived in what points it consists, and fixed in our memory an exact recollection of those points. This want of clearness, or, as it may be otherwise called, this vagueness, in the general conception, may be owing either to our having no accurate knowledge of the objects themselves, or merely to our not having carefully compared them. Thus a person may have no clear idea of a ship because he has never seen one, or because he remembers but little, and that faintly, of what he has seen. Or he may have a perfect knowledge and remembrance of many ships of various kinds, frigates among the rest, but he may have no clear but only

*Other examples of inappropriate conceptions are given by Dr. Whewell (*Philosophy of the Inductive Sciences*, Vol. II, p. 185) as follows: "Aristotle and his followers endeavoured in vain to account for the mechanical relation of forces in the lever, by applying the *inappropriate* geometrical conceptions of the properties of the circle: they failed in explaining the *form* of the luminous spot made by the sun shining through a hole, because they applied the *inappropriate* conception of a circular *quality* in the sun's light: they speculated to no purpose about the elementary composition of bodies, because they assumed the *inappropriate* conception of *likeness* between the elements and the compound, instead of the genuine notion of elements merely *determining* the qualities of the compound." But in these cases there is more than an inappropriate conception; there is a false conception; one which has no prototype in nature, nothing corresponding to it in facts. This is evident in the last two examples, and is equally true in the first; the "properties of the circle" which were referred to, being purely fantastical. There is, therefore, an error beyond the wrong choice of a principle of generalization; there is a false assumption of matters of fact. The attempt is made to resolve certain laws of nature into a more general law, that law [i]not being[i] one which, though real, is inappropriate, but one wholly imaginary.

[h-h]+62, 65, 68, 72
[a-a]MS, 43, 46, 51 it should] 56 we should
[i-i]MS, 43, 46, 51 being not

a confused idea of a frigate, because he [b]has never been told, and[b] has not compared them sufficiently to have remarked and remembered, in what particular points a frigate differs from some other kind of ship.

It is not, however, necessary, in order to have clear ideas, that we should know all the common properties of the things which we class together. That would be to have our [c]conception[c] of the class complete as well as clear. It is sufficient if we never class things together without knowing exactly why we do so,—without having ascertained exactly what agreements we are about to include in our conception; and if, after having thus fixed our conception, we never vary from it, never include in the class anything which has not those common properties, nor exclude from it anything which has. A clear conception means a determinate conception; one which does not fluctuate, which is not one thing to-day and another to-morrow, but remains fixed and invariable, except when, from the progress of our knowledge, or the correction of some error, we consciously add to it or alter it. A person of clear ideas, is a person who always knows in virtue of what properties his classes are constituted; what attributes are connotated by his general names.

The principal requisites, therefore, of clear conceptions, are habits of attentive observation, an extensive experience, and a memory which receives and retains an exact image of what is observed. And in proportion as any one has the habit of observing minutely and comparing carefully a particular class of phenomena, and an accurate memory for the results of the observation and comparison, so will his conceptions of that class of phenomena be clear; provided he has the indispensable habit, (naturally, however, resulting from those other endowments,) of never using general names without a precise connotation.

As the clearness of our conceptions chiefly depends on the *carefulness* and *accuracy* of our observing and comparing faculties, so their appropriateness, or rather the chance we have of hitting upon the appropriate conception in any case, mainly depends on the *activity* of the same faculties. He who by habit, grounded on sufficient natural aptitude, has acquired a readiness in accurately observing and comparing phenomena, will perceive so many more agreements and will perceive them so much more rapidly than other people, that the chances are much greater of his perceiving, in any instance, the agreement on which the important consequences depend.

§ 6. [[a]*Further illustration of the subject*[a]] [b]It is of so much importance that the part of the process of investigating truth, discussed in this chapter,

[b-b]+56, 62, 65, 68, 72
[c-c]43, 46 conceptions [*printer's error in* 43?]
[a-a]MS, 43, 46, 51, 56 *Cases in which the conception must pre-exist*
[b-b661]+62, 65, 68, 72

should be rightly understood, that I think it [c]is[c] desirable to restate the results we have arrived at, in a somewhat different mode of expression.

We cannot ascertain general truths, that is, truths applicable to classes, unless we have formed the classes in such a manner that general truths can be [d]affirmed[d] of them. In the formation of any class, there is involved a conception of it as a class, that is, a conception of certain circumstances as being those which characterize the class, and distinguish the objects composing it from all other things. When we know exactly what these circumstances are, we have a clear idea (or conception) of the class, and of the meaning of the general name which designates it. The primary condition implied in having this clear idea, is that the class be really a class; that it correspond to a real distinction; that the things it includes really do agree with one another in certain particulars, and differ, in those same particulars, from all other things. A person without clear ideas, is one who habitually classes together, under the same general names, things which have no common properties, or none which are not possessed also by other things; or who, if the usage of other people prevents him from actually misclassing things, is unable to state to himself the common properties in virtue of which he classes them rightly.

But it is not the sole requisite of classification that the classes should be real classes, framed by a legitimate mental process. Some modes of classing things are more valuable than others for human uses, whether of speculation or of practice; and our classifications are not well made, unless the things which they bring together not only agree with each other in something which distinguishes them from all other things, but agree with each other and differ from other things in the very circumstances which are of primary importance for the purpose (theoretical or practical) which we have in view, and which constitutes the problem before us. In other words, our conceptions, though they may be clear, are not *appropriate* for our purpose, unless the properties we comprise in them are those which will help us towards what we wish to understand—*i.e.*, either those which go deepest into the nature of the things, if our object to be understand that, or those which are most closely connected with the particular property which we are endeavouring to investigate.

We cannot, therefore, frame good general conceptions beforehand. That the conception we have obtained is the one we want, can only be known when we have done the work for the sake of which we wanted it; when we completely understand the general character of the phenomena, or the conditions of the particular property with which we concern ourselves. General conceptions formed without this thorough knowledge, are Bacon's "notiones temerè à rebus abstractæ."[*] Yet such premature conceptions we must be

[*Novum Organum, Bk. I, Aph. 14, p. 158.]

[c-c]+68, 72 [d-d]62 predicated

continually making up, in our progress to something better. They are an impediment to the progress of knowledge, only when they are permanently acquiesced in. When it has become our habit to group things in wrong classes —in groups which either are not really classes, having no distinctive points of agreement (absence of *clear* ideas), or which are not classes of which anything important to our purpose can be predicated (absence of *appropriate* ideas); and when, in the belief that these badly made classes are those sanctioned by Nature, we refuse to exchange them for others, and cannot or will not make up our general conceptions from any other elements; in that case all the evils which Bacon ascribes to his "notiones temerè abstractæ" really occur. This was what the ancients did in physics, and what the world in general does in morals and politics to the present day.

It would thus, in my view of the matter, be an inaccurate mode of expression to say, that obtaining appropriate conceptions is a condition precedent to generalization. Throughout the whole process of comparing phenomena with one another for the purpose of generalization, the mind is trying to make up a conception; but the conception which it is trying to make up is that of the really important point of agreement in the phenomena. As we obtain more knowledge of the phenomena themselves, and of the conditions on which their important properties depend, our views on this subject naturally alter; and thus we advance from a less to a more "appropriate" general conception, in the progress of our investigations.[b]

We [e]ought[e] not, at the same time, to forget that the [f]really important[f] agreement cannot always be discovered by mere comparison of the very phenomena in question, without the aid of a conception acquired elsewhere; as in the case, so often referred to, of the planetary orbits.

[g] The search for the agreement of a set of phenomena is in truth very similar to the search for a lost or hidden object. At first we place ourselves in a sufficiently commanding position, and cast our eyes round us, and if we can see the object it is well; if not, we ask ourselves mentally what are the places in which it may be hid, in order that we may there search for it: and so on, until we imagine the place where it really is. And here too we require to have had a previous conception, or knowledge, of those different places. As in this familiar process, so in the philosophical operation which it illustrates, we first endeavour to find the lost object or recognise the common attribute, without conjecturally invoking the aid of any previously acquired conception, or in other words, of any hypothesis. Having failed in this, we call upon our imagination for some hypothesis of a possible place, or a possible point of resemblance, and then look, to see whether the facts agree with the conjecture.

[e-e]MS, 43, 46, 51, 56 are
[f-f]+62, 65, 68, 72
[g]MS [*no paragraph*] [*printer's error?*]

For such cases something more is required than a mind accustomed to accurate observation and comparison. It must be a mind stored with general conceptions, previously acquired, of the sorts which bear affinity to the subject of the particular inquiry. And much will also depend on the natural strength and acquired culture of what has been termed the scientific imagination; on the faculty possessed of mentally arranging known elements into new combinations, such as have not yet been observed in nature, though not contradictory to any known laws.

But the variety of intellectual habits, the purposes which they serve, and the modes in which they may be fostered and cultivated, are considerations belonging to the Art of Education: a subject far wider than Logic, and which [h]this[h] treatise does not profess to discuss. Here, therefore, the present chapter may properly close. [i]

[h-h]MS, 43, 46 the present

[i]MS, 43, 46 It constitutes a real digression from the main purpose of this work; to which nothing would have tempted me but the apparent necessity, in promulgating a view of induction opposed to that which is taught by an eminent living writer, of not shrinking from an encounter with him on his own ground, but entering sufficiently into the spirit of his views to show how much of the difference is apparent and how much real; what is the equivalent expression for his doctrines in my own language; and what are the reasons which lead me, even where the opinions are similar, to adopt a different mode of statement.] 51, 56 *as* MS . . . spirit of his speculations to . . . *as* MS

CHAPTER III

Of Naming, as Subsidiary to Induction

§ 1. [*The fundamental property of names as an instrument of thought*] It does not belong to the present undertaking to dwell on the importance of language as a medium of human intercourse, whether for purposes of sympathy or [a]of[a] information. Nor does our design admit of more than a passing allusion to that great property of names, on which their functions as an intellectual instrument are, in reality, ultimately dependent; their potency as a means of forming, and of riveting, associations among our other ideas: a subject on which an able thinker* has thus written:

> Names are impressions of sense, and as such take the strongest hold on the mind, and of all other impressions can be most easily recalled and retained in view. They therefore serve to give a point of attachment to all the more volatile objects of thought and feeling. Impressions that when passed might be dissipated for ever, are, by their connexion with language, always within reach. Thoughts, of themselves, are perpetually slipping out of the field of immediate mental vision; but the name abides with us, and the utterance of it restores them in a moment. Words are the custodiers of every product of mind less impressive than themselves. All extensions of human knowledge, all new generalizations, are fixed and spread, even unintentionally, by the use of words. The child growing up learns, along with the vocables of his mother-tongue, that things which he would have believed to be different, are, in important points, the same. Without any formal instruction, the language in which we grow up teaches us all the common philosophy of the age. It directs us to observe and know things which we should have overlooked; it supplies us with classifications ready made, by which things are arranged (as far as the light of [c]bygone[c] generations admits) with the objects to which they bear the greatest total resemblance. The number of general names in a language, and the degree of generality of those names, afford a test of the knowledge of the era, and of the intellectual insight which is the birthright of any one born into it.

It is not, however, of the functions of Names, considered generally, that we have here to treat, but only of the manner and degree in which they are directly instrumental to the investigation of truth; in other words, to the process of induction.

*[56] [b]Professor[b] Bain.

[a-a]+51, 56, 62, 65, 68, 72 [b-b]56, 62 Mr.
[c-c]MS gone-by

§ 2. [*Names are not indispensable to induction*] Observation and Abstraction, the operations which formed the subject of the two foregoing chapters, are conditions indispensable to induction; there can be no induction where they are not. It has been imagined that Naming is also a condition equally indispensable. There are [a]thinkers[a] who have held that language is not solely, according to a phrase generally current, *an* instrument of thought, but [b]*the*[b] instrument: that names, or something equivalent to them, some species of artificial signs, are necessary to reasoning; that there could be no inference, and consequently no induction, without them. But if the nature of reasoning was correctly explained in the earlier part of the present work, this opinion must be held to be an exaggeration, though of an important truth. If reasoning be from particulars to particulars, and if it [c]consist[c] in recognising one fact as a mark of another, or a mark of a mark of another, nothing is required to render reasoning possible, except senses and association: senses to perceive that two facts are conjoined; association, as the law by which one of those two facts raises up the idea of the other.* For these mental phenomena, as well as for the belief or expectation which follows, and by which we recognise as having taken place, or as about to take place, that of which we have perceived a mark, there is evidently no need of language. And this inference of one particular fact from another is a case of induction. It is of this sort of induction that brutes are capable: it is in this shape that uncultivated minds make almost all their inductions, and that we all do so in the cases in which familiar experience forces our conclusions upon us without any active process of inquiry on our part, and in which the belief or expectation follows the suggestion of the evidence with the promptitude and certainty of an instinct.†

*[51] This sentence having been erroneously understood [by Hutton, in "Mill and Whewell on the Logic of Induction," p. 91,] as if I had meant to assert that belief is nothing but an irresistible association, I think it necessary to observe that I express no theory respecting the [d]the ultimate analysis[d] either of reasoning or of belief, two of the most obscure points in [e]analytical[e] psychology. I am speaking not of the powers themselves, but of the previous conditions necessary to enable those powers to exert themselves: of which conditions I am contending that language is not one, senses and association being sufficient without it. [f]The irresistible-association theory of belief, and the difficulties connected with the subject, have been discussed at length in the notes to the new edition of Mr. James Mill's *Analysis of the Phenomena of the Human Mind*. [Ed. J. S. Mill. 2 vols. London: Longmans, 1869.][f]

†[62] Mr. Bailey agrees with me in thinking that whenever "from something actually present to my senses, conjoined with past experience, I feel satisfied that something has happened, or will happen, or is happening, beyond the sphere of

[a–a]MS, 43, 46 philosophers
[b–b]MS the sole
[c–c]56, 62 consists
[d–d]51, 56 essential nature
[e–e]51 analytic
[f–f]+72

§ 3. [*In what manner names are subservient to induction*] But though inference of an inductive character is possible without the use of signs, it could never, without them, be carried much beyond the very simple cases which we have just described, and which form, in all probability, the limit of the reasonings of those animals to whom conventional language is unknown. Without language, or something equivalent to it, there could only be as much [a] reasoning from experience as can take place without the aid of general propositions. Now, though in strictness we may reason from past experience to a fresh individual case without the intermediate stage of a general proposition, yet without general propositions we should seldom remember what past experience we have had, and scarcely ever what conclusions that experience will warrant. The division of the inductive process into two parts, the first ascertaining what is a mark of the given fact, the second whether in the new case that mark exists, is natural, and scientifically indispensable. It is, indeed, in a majority of cases, rendered necessary by mere distance of time. The experience by which we are to guide our judgments may be other people's experience, little of which can be communicated to us otherwise than by language: when it is our own, it is generally experience long past; unless, therefore, it were [b] recorded by means of artificial signs, little of it (except in cases involving our intenser sensations or emotions, or the subjects of our daily and hourly [c]contemplation[c]) would be retained in the memory. It is hardly necessary to add, that when the inductive inference is of any but the most direct and obvious nature—when it requires several observations or experiments, in varying circumstances, and the comparison of one of these with another—it is impossible to proceed a step, without the artificial memory which words bestow. Without words, we should, if we had often seen A and B in immediate and obvious conjunction, expect B whenever we saw A; but to discover their conjunction when not obvious, or to determine whether it is really constant or only casual, and whether there is reason to expect it under any given change of circumstances, is a process far too complex to be performed without some contrivance to make our remembrance of our own mental operations accurate. Now, language is such a contrivance. When that instrument is called to our aid, the difficulty is reduced to that of making our remembrance of the meaning of words accurate. This being secured, whatever passes through our minds may be remembered accurately, by putting it carefully into words, and committing the words either to writing or to memory.

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my personal observation," I may with strict propriety be said to reason: and of course to reason inductively, for demonstrative reasoning is excluded by the circumstances of the case. (*The Theory of Reasoning*, 2nd ed., p. 27.)

[a-a]MS, 43, 46, 51, 56 of [b]MS noted down &
[c-c]MS, 43, 46, 51, 56 contemplations

The function of Naming, and particularly of General Names, in Induction, may be recapitulated as follows. Every inductive inference which is good at all, is good for a whole class of cases: and, that the inference may have any better warrant of its correctness than the mere clinging together of two ideas, a process of experimentation and comparison is necessary; in which the whole class of cases must be brought to view, and some uniformity in the course of nature evolved and ascertained, since the existence of such an uniformity is required as a justification for drawing the inference in even a single case. This uniformity, therefore, may be ascertained once for all; and if, being ascertained, it can be remembered, it will serve as a formula for making, in particular cases, all such inferences as the previous experience will warrant. But we can only secure its being remembered, or give ourselves even a chance of carrying in our memory any considerable number of such uniformities, by registering them through the medium of permanent signs; which (being, from the nature of the case, signs not of an individual fact, but of an uniformity, that is, of an indefinite number of facts similar to one another) are general signs; universals; general names, and general propositions.

§ 4. [*General names not a mere contrivance to economize the use of language*] And here I cannot omit to notice an oversight committed by some eminent [a]thinkers[a]; who have said that the cause of our using general names is the infinite multitude of individual objects, which, making it impossible to have a name for each, compels us to make one name serve for many. This is a very limited view of the function of general names. Even if there were a name for every individual object, we should require general names as much as we now do. Without them we could not express the result of a single comparison, nor record any one of the uniformities existing in nature; and should be hardly better off in respect to Induction than if we had no names at all. With none but names of individuals, (or in other words, proper names,) we might, by pronouncing the name, suggest the idea of the object, but we could not assert [b]any[b] proposition; except the unmeaning ones formed by predicating two proper names one of another. It is only by means of general names that we can convey any information, predicate any attribute, even of an individual, much more of a class. Rigorously speaking we could get on without any other general names than the abstract names of attributes; all our propositions might be of the form "such an individual object possesses such an attribute," or "such an attribute is always (or never) conjoined with such another attribute." In fact, however, mankind have always given general names to objects as well as attributes, and indeed before attributes: but the general names given to objects imply attributes, derive their whole meaning

[a-a]MS, 43, 46, 51, 56, 62, 65 metaphysicians
[b-b]MS, 43, 46, 51, 56, 62, 65 a single

from attributes: and are chiefly useful as the language by means of which we predicate the attributes which they connote.

It remains to be considered what principles are to be adhered to in giving general names, [c]so that these[c] names, and the general propositions in which they fill a place, may conduce most to the purposes of Induction. [d]

[c-c]MS that those
[d]MS And they will be the subject of the succeeding Chapters.

CHAPTER IV

Of the Requisites of a Philosophical Language, and the Principles of Definition

§ 1. [*First requisite of philosophical language, a steady and determinate meaning for every general name*] In order that we may possess a language perfectly suitable for the investigation and expression of general truths, there are two principal, and several minor, requisites. The first is, that every general name should have a meaning, steadily fixed, and precisely determined. When, by the fulfilment of this condition, such names as we possess are fitted for the due performance of their functions, the next requisite, and the second in order of importance, is that we should possess a name wherever one is needed; wherever there is anything to be designated by it, which it is of importance to express.

The former of these requisites is that to which our attention will be exclusively directed in the present chapter.

§ 2. [*Names in common use have often a loose connotation*] Every general name, then, must have a certain and knowable meaning. Now the meaning (as has so often been explained) of a general [a]connotative[a] name, resides in the connotation; in the attribute on account of which, and to express which, the name is given. Thus, the name animal being given to all things which possess the attributes of sensation and voluntary motion, the word connotes those attributes exclusively, and they constitute the whole of its meaning. If the name be abstract, its denotation is the same with the connotation of the corresponding concrete: it designates directly the attribute, which the concrete term implies. To give a precise meaning to general names is, then, to fix with steadiness the attribute or attributes connoted by each concrete general name, and denoted by the corresponding abstract. Since abstract names, in the order of their creation, do not precede but follow concrete ones, as is proved by the etymological fact that they are

[a-a]MS concrete

almost always derived from them; we may consider their meaning as determined by, and dependent on, the meaning of their concrete: and thus the problem of giving a distinct meaning to general language, is all included in that of giving a precise connotation to all concrete general names.

This is not difficult in the case of new names; of the technical terms created by [b]scientific[b] inquirers for the purposes of science or art. But when a name is in common use, the difficulty is greater; the problem in this case not being that of choosing a convenient connotation for the name, but of ascertaining and fixing the connotation with which it is already used. That this can ever be a matter of doubt, is a sort of paradox. But the vulgar (including in that term all who have not accurate habits of thought) seldom know exactly what assertion they intend to make, what common property they mean to express, when they apply the same name to a number of different things. All which the name expresses with them, when they predicate it of an object, is a confused feeling of resemblance between [c]that[c] object and some of the other things which they have been accustomed to denote by the name. They have applied the name Stone to various objects previously seen; they see a new object, which appears to them [d]somewhat[d] like the former, and they call it a stone, without asking themselves in what respect it is like, or what mode or degree of resemblance the best authorities, or even they themselves, require as a warrant for using [e]the[e] name. This rough general impression of resemblance is, however, made up of particular circumstances of resemblance; and into these it is the business of the logician to analyse it; to ascertain what points of resemblance among the different things commonly called by the name, have produced [f]in[f] the common mind this vague feeling of likeness; have given to the things the similarity of aspect, which has made them a class, and has caused the same name to be bestowed upon them.

But though general names are imposed by the vulgar without any more definite connotation than that of a vague resemblance; general propositions come in time to be made, in which predicates are applied to those names, that is, general assertions are made concerning the *whole* of the things which are denoted by the name. And since by each of these propositions some attribute, more or less precisely conceived, is of course predicated, the [g]ideas[g] of these various attributes thus become associated with the name, and in a sort of uncertain way it comes to connote them; there is a hesitation to apply the name in any new case in which any of the attributes familiarly predicated of the class [h]do[h] not exist. And thus, to common minds, the propositions which they are in the habit of hearing or uttering concerning a class, make up

[b-b]MS, 43, 46 philosophic
[c-c]MS the
[d-d]MS, 43, 46, 51 something
[e-e]MS that
[f-f]MS, 43 upon
[g-g]MS, 43, 46, 51, 56 idea
[h-h]MS, 43, 46, 51, 56, 62 does

in a loose way a sort of connotation for the class-name. Let us take, for instance, the word Civilized. How [i]few could be found, even among the most educated persons, who would undertake to say exactly what the term Civilized connotes.[i] Yet there is a feeling in the minds of all who use it, that they are using it with a meaning; and this meaning is made up, in a confused manner, of everything which they have heard or read that civilized men, or civilized communities, are, or [j]may be expected to[j] be.

It is at this stage, probably, in the progress of a concrete name, that the corresponding abstract name generally comes into use. Under the notion that the concrete name must of course convey a meaning, or in other words, that there is some property common to all [k] things which it denotes, [l]people[l] give a name to this common property; from the concrete Civilized, they form the abstract Civilization. But since most people have never compared the different things which are called by the concrete name, in such a manner as to ascertain what properties [m]these[m] things have in common, or whether they have any; each is thrown back upon the marks by which he himself has been accustomed to be guided in his application of the term: and these, being merely vague hearsays and current phrases, are not the same in any two persons, nor in the same person at different times. Hence the word (as Civilization, for example) which professes to be the designation of the unknown common property, conveys scarcely to any two minds the same idea. No two persons agree in the things they predicate of it; and when it is itself predicated of anything, no other person knows, nor does the speaker himself know with precision, what he means to assert. Many other words which could be named, as the word *honour*, or the word *gentleman*, exemplify this uncertainty still more strikingly.

It needs scarcely be observed, that general propositions of which no one can tell exactly what they assert, cannot possibly have been brought to the test of a correct induction. Whether a name is to be used as an instrument of thinking, or as a means of communicating the result of thought, it is imperative to determine exactly the attribute or attributes which it is to express: to give it, in short, a fixed and ascertained connotation.

§ 3. [*The logician should fix the connotation of names in common use, with as little alteration as possible*] It would, however, be a complete misunderstanding of the proper office of a logician in dealing with terms already in use, if [a]we[a] were to think that because a name has not at present an ascertained connotation, it is competent to any one to give it such a con-

[i-i]MS many could . . . connotes?
[j-j]MS, 43, 46 should
[k]MS the
[l-l]MS, 43, 46 men
[m-m]MS those [*printer's error?*]
[a-a]MS, 43, 46, 51, 56, 62 he

notation at his own choice. The meaning of a term actually in use is not an arbitrary quantity to be fixed, but an unknown quantity to be sought.

In the first place, it is obviously desirable to avail ourselves, as far as possible, of the associations already connected with the name; not enjoining the employment of it in a manner which conflicts with all previous habits, and especially not so as to require the rupture of those strongest of all associations between names, which are created by familiarity with propositions in which they are predicated of one another. A philosopher would have little chance of having his example followed, if he were to give such a meaning to his terms as should require us to call the North American Indians a civilized people, or the higher classes in [b]Europe[b] savages; or to say that civilized people live by hunting, and savages by agriculture. Were there no other reason, the extreme difficulty of effecting so complete a revolution in speech would be more than a sufficient one. The endeavour should be, that all generally received propositions into which the term enters, should be at least as true after its meaning is fixed, as they were before; and that the concrete name, therefore, should not receive such a connotation as shall prevent it from denoting things which, in common language, it is currently affirmed of. The fixed and precise connotation which it receives, should not be in deviation from, but in agreement (as far as it goes) with, the vague and fluctuating connotation which the term already had.

To fix the connotation of a concrete name, or the denotation of the corresponding abstract, is to define the name. When this can be done without rendering any received assertions inadmissible, the name can be defined in accordance with its received use, which is vulgarly called defining not the name but the thing. What is meant by the improper expression of defining a thing, [c](or rather a class of things—for[c] nobody talks of defining an individual), is to define the name, subject to the condition that it shall denote those things. This, of course, supposes a comparison of the things, feature by feature and property by property, to ascertain what attributes they agree in; and not unfrequently an operation [d] strictly inductive, for the purpose of ascertaining some unobvious agreement, which is the cause of the obvious agreements.

For, in order to give a connotation to a name, consistently with its denoting certain objects, we have to make our selection from among the various attributes in which those objects agree. To ascertain in what they do agree is, therefore, the first logical operation requisite. When this has been done as far as is necessary or practicable, the question arises, which of these common attributes shall be selected to be associated with the name. For if the class

[b-b]MS, 43, 46, 51, 56, 62, 65, 68 France or England
[c-c]MS or rather a class of things (for
[d]MS, 43, 46, 51 still more

which the name denotes be a Kind, the common properties are innumerable; and even if not, they are often extremely numerous. Our choice is first limited by the preference to be given to [e] properties which are well known, and familiarly predicated of the class; but even these are often too numerous to be all included in the definition, and, besides, the properties most generally known may not be those which serve best to mark out the class from all others. We should therefore select from among the common properties, (if among them any such are to be found,) those on which it has been ascertained by experience, or proved by deduction, that many others depend; or at least which are sure marks of them, and from whence, therefore, many others will follow by inference. We thus see that to frame a good definition of a name already in use, is not a matter of choice but of discussion, and discussion not merely respecting the usage of language, but respecting the properties of things, and even the origin of those properties. And hence every enlargement of our knowledge of the objects to which the name is applied, is liable to suggest an improvement in the definition. It is impossible to frame a perfect set of definitions on any subject, until the theory of the subject is perfect: and as science makes progress, its definitions are also progressive.

§ 4. [*Why definition is often a question not of words but of things*] The discussion of Definitions, in so far as it does not turn on the use of words but on the properties of things, Dr. Whewell calls the Explication of Conceptions. The act of ascertaining, better than before, in what particulars any phenomena which are classed together agree, [a]he calls in his technical phraseology[a], unfolding the general conception in virtue of which they are so classed.[*] Making allowance for what appears to me the darkening and misleading tendency of this mode of expression, several of his remarks are so much to the purpose, that I shall take the liberty of transcribing them.

He observes,* that many of the controversies which have had an important share in the formation of the existing body of science, have

assumed the form of a battle of Definitions. For example, the inquiry concerning the laws of falling bodies, led to the question whether the proper definition of a *uniform force* is that it generates a velocity proportional to the *space* from rest, or to the *time*. The controversy of the *vis viva* was what was the proper definition of the *measure of force*. A principal question in the classification of minerals is, what is the definition of a *mineral species*. Physiologists have endeavoured to throw light on their subject by defining *organization*, or some similar term.

[**Novum Organon Renovatum*, p. 31.]

**Ibid.*, pp. 35–6.

[e]MS the

[a–a]MS, 43 Mr. Whewell in his technical phraseology calls

Questions of the same nature [b]were long open and are not yet completely closed,[b] respecting the definitions of Specific Heat, Latent Heat, Chemical Combination, and Solution.

It is very important for us to observe, that these controversies have never been questions of insulated and *arbitrary* definitions, as men seem often tempted to imagine them to have been. In all cases there is a tacit assumption of some proposition which is to be expressed by means of the definition, and which gives it its importance. The dispute concerning the definition thus acquires a real value, and becomes a question concerning true and false. Thus in the discussion of the question, What is a uniform force? it was taken for granted that gravity is a uniform force. In the debate of the *vis visa*, it was assumed that in the mutual action of bodies the whole effect of the force is unchanged. In the zoological definition of species, (that it consists of individuals which have, or may have, sprung from the same parents,) it is presumed that individuals so related resemble each other more than those which are excluded by such a definition; or, perhaps, that species so defined have permanent and definite differences. A definition of organization, or of some other term, which was not employed to express some principle, would be of no value.

The establishment, therefore, of a right definition of a term, may be a useful step in the explication of our conceptions; but this will be the case then only when we have under our consideration some proposition in which the term is employed. For then the question really is, how the conception shall be understood and defined in order that the proposition may be true.[*]

To unfold our conceptions by means of definitions has never been serviceable to science, except when it has been associated with an immediate use of the definitions. The endeavour to define a Uniform Force was combined with the assertion that gravity is a uniform force: the attempt to define Accelerating Force was immediately followed by the doctrine that accelerating forces may be compounded: the process of defining Momentum was connected with the principle that momenta gained and lost are equal: naturalists would have given in vain the definition of Species which we have quoted, if they had not also given the characters of species so separated. . . . Definition may be the best mode of explaining our conception, but that which alone makes it worth while to explain it in any mode, is the opportunity of using it in the expression of truth. When a definition is propounded to us as a useful step in knowledge, we are always entitled to ask what principle it serves to enunciate.[†]

In giving [c], then,[c] an exact connotation to the phrase, "an uniform force," [d]the condition was understood[d], that the phrase should continue to denote gravity. The discussion, therefore, respecting the definition, resolved itself into this question, What is there of an uniform nature in the motions pro-

[*Ibid., p. 36.] [†Ibid., p. 37.]

[b-b]MS, 43, 46, 51, 56, 62, 65, 68 are still open
[c-c]+46, 51, 56, 62, 65, 68, 72
[d-d]MS, 43 philosophers (as Mr. Whewell observes) restricted themselves by the condition] 46 philosophers restricted themselves by the condition

duced by gravity? By observations and comparisons, it was found, that what was uniform in those motions was the ratio of the velocity [e]acquired[e] to the time elapsed; equal velocities being added in equal times. An uniform force, therefore, was defined, a force which adds equal velocities in equal times. So, again, in defining momentum. It was already a received doctrine, that when two objects impinge upon one another, the momentum lost by the one is equal to that gained by the other. This proposition it was deemed necessary to preserve, not [f] from the motive (which operates in many other cases) that it was firmly fixed in popular belief; for the proposition in question had never been heard of by any but [g]the scientifically instructed[g]. But it was felt to contain a truth: even a superficial observation of the phenomena left no doubt that in the propagation of motion from one body to another, there was something of which the one body gained precisely what the other lost; and the word momentum had been invented to express this unknown something. [h]The settlement, therefore, of the definition of momentum, involved[h] the determination of the question, What is that of which a body, when it sets another body in motion, loses exactly as much as it communicates? And when experiment had shown that this *something* was the product of the velocity of the body by its mass, or quantity of matter, this became the definition of momentum.

[i]The following remarks,* therefore, are perfectly just:[i]

> The business of definition is part of the business of discovery. . . . To define, so that our definition shall have any scientific value, requires no small portion of that sagacity by which truth is detected. . . . When it has been clearly seen what ought to be our definition, it must be pretty well known what truth we have to state. The definition, as well as the discovery, supposes a decided step in our knowledge to have been made. The writers on Logic, in the middle ages, made Definition the last stage in the progress of knowledge; and in this arrangement at least, the history of science, and the philosophy derived from the history, confirm their speculative views.

For in order to judge [j]finally[j] how the name which denotes a class may best be defined, we must know all the properties common to the class, and all the relations of causation or dependence among those properties.

If the properties which are fittest to be selected as marks of other common properties are also obvious and familiar, and especially if they bear a great

**Ibid.*, pp. 39–40.

[e-e]43, 46 required [*printer's error?*]
[f]MS, 43, 46 however
[g-g]MS, 43, 46 scientific men
[h-h]MS, 43, 46, 51, 56, 62 In the settlement . . . momentum, was contained
[i-i]MS, 43 Mr. Whewell very justly adds*,
[j-j]+51, 56, 62, 65, 68, 72

part in producing that general [k] air of resemblance which was the original inducement to the formation of the class, the definition will then be most felicitous. But it is often necessary to define the class by some property not familiarly known, provided that property be the best mark of those which are known. M. de Blainville, for instance, [l] founded his definition of life on the process of decomposition and recomposition which incessantly [m]takes place[m] in every living body, so that the particles composing it are never for two instants the same.[*] This is by no means one of the most obvious properties of living bodies; it might escape altogether the notice of an unscientific observer. Yet great authorities (independently of M. de Blainville, who is himself a first-rate authority) have thought [n] that no other property so well answers the conditions required for the definition.

§ 5. [*How the logician should deal with the transitive applications of words*] Having laid down the principles which ought for the most part to be observed in attempting to give a precise connotation to a term in use, I must now add, that it is not always practicable to adhere to those principles, and that even when practicable, it is occasionally not desirable.

[a] Cases in which it is impossible to comply with all the conditions of a precise definition of a name in agreement with usage, occur very frequently. There is often no one connotation capable of being given to a word, so that it shall still denote everything it is accustomed to denote; or that all the propositions into which it is accustomed to enter, and which have any foundation in truth, shall remain true. Independently of accidental ambiguities, [b]in which[b] the different meanings have no connexion with one another; it continually happens that a word is used in two or more senses derived from each other, but yet radically distinct. So long as a term is vague, that is, so long as its connotation is not ascertained and permanently fixed, it is constantly liable to be applied by *extension* from one thing to another, until it reaches things which have little, or even no, resemblance to those which were first designated by it.

Suppose, says Dugald Stewart, in his *Philosophical Essays*,*

that the letters A, B, C, D, E, denote a series of objects; that A possesses some one quality in common with B; B a quality in common with C; C a quality in common with D; D a quality in common with E; while at the same time, no quality can be found which belongs in common to any *three* objects in the series. Is it not

[*See *De l'Organisation des animaux*, pp. 15–16.]
*Pp. 217–18, 4to edition.

[k]MS, 43, 46 and superficial
[l]MS, 43, 46 has
[m–m]MS, 43, 46 goes on
[n]MS, 43, 46, 51, 56, 62 , seemingly with much reason,
[a]MS, 43 [*no paragraph*]
[b–b]MS when

conceivable, that the affinity between A and B may produce a transference of the name of the first to the second; and that, in consequence of the other affinities which connect the remaining objects together, the same name may pass in succession from B to C; from C to D; and from D to E? In this manner, a common appellation will arise between A and E, although the two objects may, in their nature and properties, be so widely distant from each other, that no stretch of imagination can conceive how the thoughts were led from the former to the latter. The transitions, nevertheless, may have been all so easy and gradual, that, were they successfully detected by the fortunate ingenuity of a theorist, we should instantly recognise, not only the verisimilitude, but the truth of the conjecture: in the same way as we admit, with the confidence of intuitive conviction, the certainty of the well-known etymological process which connects the Latin preposition *e* or *ex* with the English substantive *stranger*, the moment that the intermediate links of the chain are submitted to our examination.*

The applications which a word acquires by this gradual extension [e]of it[e] from one set of objects to another, Stewart,[*] adopting an expression from Mr. Payne Knight,[†] calls its *transitive* applications; and after briefly illustrating such of them as are the result of local or casual associations, he proceeds as follows:†

*"E, ex, extra, extraneus, étranger, stranger." [*Stewart's footnote.*]

Another etymological example sometimes cited is the derivation of the English *uncle* from the Latin *avus*. It is scarcely possible for two words to bear fewer outward marks of relationship, yet there is but one step between them, *avus, avunculus, uncle.* [c] So *pilgrim*, from *ager*: *per agrum, peragrinus, peregrinus, pellegrino, pilgrim.*

[d]Professor Bain gives some apt examples of these transitions of meaning. "The word 'damp' primarily signified moist, humid, wet. But the property is often accompanied with the feeling of cold or chillness, and hence the idea of cold is strongly suggested by the word. This is not all. Proceeding upon the superadded meaning, we speak of damping a man's ardour, a metaphor where the cooling is the only circumstance concerned; we go on still further to designate the iron slide that shuts off the draft of a stove, 'the damper,' the primary meaning being now entirely dropped. 'Dry,' in like manner, through signifying the absence of moisture, water, or liquidity, is applied to sulphuric acid containing no water, although not thereby ceasing to be a moist, wet, or liquid substance." So in the phrases, dry sherry, or champagne.

"'Street,' originally a paved way, with or without houses, has been extended to roads lined with houses, whether paved or unpaved. 'Impertinent' signified at first irrelevant, alien to the purpose in hand: through which it has come to mean, meddling, intrusive, unmannerly, insolent." (*Logic*, Part II, pp. 173, 174.)[d]

[**Philosophical Essays*, p. 218.]

[†See Richard Payne Knight. *An Analytical Inquiry into the Principles of Taste*. London: Payne, and White, 1805, p. 11.]

†[*Philosophical Essays*,] pp. 226–7 [*JSM's italics*].

[c]MS, 43, 46, 51, 56, 62, 65, 68 [*paragraph*]

[d–d]+72

[e–e]+43, 46, 51, 56, 62, 65, 68, 72

But although by far the greater part of the transitive or derivative applications of words depend on casual and unaccountable caprices of the feelings or the fancy, there are certain cases in which they open a very interesting field of philosophical speculation. Such are those, in which an analogous transference of the corresponding term may be remarked universally, or very generally, in other languages; and in which, of course, the uniformity of the result must be ascribed to the essential principles of the human frame. Even in such cases, however, it will by no means be always found, on examination, that the various applications of the same term have arisen from any common quality or qualities in the objects to which they relate. In the greater number of instances, they may be traced to some natural and universal associations of ideas, founded in the common faculties, common organs, and common condition of the human race. . . . According to the different degrees of intimacy and strength in the associations on which the *transitions* of language are founded, very different effects may be expected to arise. Where the association is slight and casual, the several meanings will remain distinct from each other, and will often, in process of time, assume the appearance of capricious varieties in the use of the same arbitrary sign. *Where the association is so natural and habitual as to become virtually indissoluble, the transitive meanings will coalesce [f]in[f] one complex conception; and every new transition will become a more comprehensive generalization of the term in question.*

I solicit particular attention to the law of mind expressed in the last sentence, and which is the source of the perplexity so often experienced in detecting these transitions of meaning. Ignorance of that law is the shoal on which some of the [g]most powerful[g] intellects which have adorned the human race have been [h]stranded[h]. The inquiries of Plato into the definitions of some of the most general terms of moral speculation are characterized by Bacon as a far nearer approach to a true inductive method than is elsewhere to be found among the ancients,[*] and are, indeed, almost perfect examples of the preparatory process of comparison and abstraction: but, from being unaware of the law just mentioned, he [i]often[i] wasted the powers of this great logical instrument on inquiries in which it could realize no result, since the phenomena, whose common properties he so elaborately endeavoured to detect, had not really any common properties. Bacon himself fell into the same error in his speculations on the nature of heat, in which [j]he evidently[j] confounded under the name hot, classes of phenomena which [k]have[k] no property in common. [l] [m] Stewart certainly overstates the matter when he speaks of "a

[**Novum Organum*, Bk. I, Aph. 105, p. 205.]

[f-f]Source, MS, 43, 46 *into*
[g-g]MS, 43 greatest
[h-h]MS, 43, 46 wrecked
[i-i]+56, 62, 65, 68, 72
[j-j]MS, 43 it is impossible not to think, with Mr. Whewell, that he
[k-k]MS, 43, 46, 51, 56, 62, 65, 68 had
[l]MS, 43 [*footnote:*] **History of the Inductive Sciences*, Vol. I, p. 48.
[m]MS, 43 Dugald

prejudice which has descended to modern times from the scholastic ages, that when a word admits of a variety of significations, these different significations must all be species of the same genus, and must consequently include some essential idea common to every individual to which the generic term can be applied:"* for both Aristotle and his followers were well aware that there are such things as ambiguities of language, and delighted in distinguishing them. But they never suspected ambiguity in the cases where (as Stewart remarks) the association on which the transition of meaning was founded is so natural and habitual, that the two meanings blend together in the mind, and a real transition becomes an apparent generalization. Accordingly they wasted [o]infinite[o] pains in endeavouring to find a definition which would serve for several distinct meanings at once: as in an instance noticed by Stewart himself, that of "causation; the ambiguity of the word which, in the Greek language, corresponds to the English word *cause*, having suggested to them the vain attempt of tracing the common idea which, in the case of any *effect*, belongs to the *efficient*, to the *matter*, to the *form*, and to the *end*. The idle generalities" (he adds) "we meet with in other philosophers, about the ideas of the *good*, the *fit*, and the *becoming*, have taken their rise from the same undue influence of popular epithets on the speculations of the learned."†

Among [p]the[p] words which have undergone so many successive transitions of meaning that every trace of a property common to all the things they are applied to, or at least common and also peculiar to those things, has been lost, Stewart considers the word Beautiful to be one. And (without attempting to decide a question which in no respect belongs to logic) I cannot but feel, with him, considerable doubt, whether the word beautiful connotes the same property when we speak of a beautiful colour, a beautiful face, a beautiful [q]scene[q], a beautiful character, and a beautiful [r]poem[r]. The word was doubtless extended from one of these objects to another on account of [s]a[s] resemblance between them, or more probably, between the emotions they excited; [t]and[t], by this progressive extension, it has at last reached things very remote from those objects of sight to which there is no doubt that it was first appropriated; and it is at least questionable whether there is now any property common to all the things [u]which, consistently with usage, may be called[u] beautiful, except the property of agreeableness, which the term certainly does connote, but which cannot be all that [v]people usually[v] intend to express by it,

* [n] *Essays*, p. 214.
†*Ibid.*, p. 215.

[n]MS, 43, 46 *Philosophical*
[o-o]MS, 43, 46 an infinity of
[p-p]+51, 56, 62, 65, 68, 72
[q-q]MS, 43, 46 action
[r-r]MS, 43, 46 solution of a mathematical problem
[s-s]MS, 43, 46 some
[t-t]MS, 43, 46, 51, 56 but
[u-u]MS, 43, 46 we call
[v-v]MS, 43, 46 we in any instance

since there are many agreeable things which [w]are never called[w] beautiful. If such be the case, it is impossible to give to the word Beautiful any fixed connotation, such that it shall denote all the objects which in common use it now denotes, but no others. A fixed connotation, however, it ought to have: for, [x]so[x] long as it has not, it is unfit to be used as a scientific term, and [y]is[y] a perpetual source of false analogies and erroneous generalizations.

This, then, constitutes a case in exemplification of our remark, that even when there is a property common to all the things denoted by a name, to erect that property into the definition and exclusive connotation of the name is not always desirable. The various things called beautiful unquestionably resemble one another in being agreeable; but to make this the definition of beauty, and so extend the word Beautiful to all agreeable things, would be to drop altogether a portion of meaning which the word really, though indistinctly, conveys, and to do what [z]depends on us[z] towards causing those qualities of the objects which the word previously, though vaguely, pointed at, to be overlooked and forgotten. It is better, in such a case, to give a fixed connotation to the term by restricting, than by extending its use; rather excluding from the epithet Beautiful some things to which it is commonly considered applicable, than leaving out of its connotation any of the qualities by which, though occasionally lost sight of, the general mind may have been habitually guided in the commonest and most interesting applications of the term. For there is no question that when people call anything beautiful, they think they are asserting more than that it is merely agreeable. They think they are ascribing a peculiar *sort* of agreeableness, analogous to that which they find in some other of the things to which they are accustomed to apply the same name. If, therefore, there be any peculiar sort of agreeableness which is common though not to all, yet to the principal things which are called beautiful, it is better to limit the denotation of the term to those things, than to leave that kind of quality without a term to connote it, and thereby divert attention from its peculiarities.

§ 6. [*Evil consequences of casting off any portion of the customary connotation of words*] The last remark exemplifies a rule of terminology, which is of great importance, and which has hardly yet been recognised as a rule, but by a few thinkers of the present [a]century[a]. In attempting to rectify the use of a vague term by giving it a fixed connotation, we must take care not to discard (unless advisedly, and on the ground of a deeper knowledge of the subject) any portion of the connotation which the word, in however in-

[w-w]MS, 43, 46 we never call
[x-x]MS as
[y-y]MS, 43, 46 , even as a word in popular use, must be
[z-z]MS in us lies
[a-a]MS, 43, 46, 51, 56, 62, 65 generation

distinct a manner, previously carried with it. For otherwise language loses one of its inherent and most valuable properties, that of being the conservator of ancient experience; the keeper-alive of those thoughts and observations of [b]former[b] ages, which may be alien to the tendencies of the passing time. This function of language is so often overlooked or undervalued, that a few observations on it appear to be extremely required.

Even when the connotation of a term has been accurately fixed, and still more if it has been left in the state of a vague unanalysed feeling of resemblance; there is a constant tendency in the word, through familiar use, to part with a portion of its connotation. It is a well-known law of the mind, that a word originally associated with a very complex cluster of ideas, is far from calling up all those ideas in the mind, every time the word is used: it calls up only one or two, from which the mind runs on by fresh associations to another set of ideas, without waiting for the suggestion of the remainder of the complex cluster. If this were not the case, [c] processes of thought could not take place with anything like the rapidity which we know they possess. Very often, indeed, when we are employing a word in our mental operations, we are so far from waiting until the complex idea which corresponds to the meaning of the word is consciously brought before us in all its parts, that we run on to new trains of ideas by the other associations which the mere word excites, without having realized in our imagination any part whatever of the meaning: thus using the word, and even using it well and accurately, and carrying on important processes of reasoning by means of it, in an almost mechanical manner; so much so, that some [d]metaphysicians[d], generalizing from an extreme case, have fancied that all reasoning is but the mechanical use of a set of terms according to a certain form. We may discuss and settle the most important interests of towns or nations, by the application of general theorems or practical maxims previously laid down, without having had consciously suggested to us, once in the whole process, the houses and green fields, the thronged market-places and domestic hearths, of which not only those towns and nations consist, but which the words town and nation confessedly mean.

Since, then, general names come in this manner to be used (and even to do a portion of their work well) without suggesting to the mind the whole of their meaning, and often with the suggestion of a very small, or no part at all of that meaning; we cannot wonder that words so used come in time to [e]be no longer capable[e] of suggesting any other of the ideas appropriated to them, than those with which the association is most immediate and strongest, or most kept up by the incidents of life: the remainder being lost altogether; unless the mind, by often consciously dwelling on them, keeps up the associa-

[b-b]MS, 43 by-gone
[c]MS, 43, 46 our
[d-d]MS, 43, 46 philosophers
[e-e]MS lose even the power

tion. Words naturally retain much more of their meaning to persons of active imagination, who habitually represent to themselves things in the concrete, with the detail which belongs to them in the actual world. To minds of a different description, the only antidote to this corruption of language is predication. The habit of predicating of the name, all the various properties which it originally connoted, keeps up the association between the name and those properties.

But in order that it may do so, it is necessary that the predicates should themselves retain their association with the properties which they severally connote. For the propositions cannot keep the meaning of the words alive, if the meaning of the propositions themselves should die. And nothing is more common than for propositions to be mechanically repeated, mechanically retained in the memory, and their truth [f]undoubtingly[f] assented to and relied on, while yet they carry no meaning distinctly home to the mind; and while the matter of fact or law of nature which they originally expressed is as much lost sight of, and practically disregarded, as if it never had been heard of at all. In those subjects which are at the same time familiar and complicated, and especially in those which are [g]so in as great a degree[g] as moral and social subjects are, it is [h]a[h] matter of common remark how many important propositions are believed and repeated from habit, while no account could be given, and no sense is practically manifested, of the truths which they convey. Hence it is, that the traditional maxims of old experience, though seldom questioned, have [i]often[i] so little effect [j]on[j] the conduct of life; because their meaning is never, by most persons, really felt, until personal experience has brought it home. And thus also it is that so many [k]doctrines[k] of religion, ethics, and even politics, so full of meaning and reality to first converts, have manifested (after the association of that meaning with the verbal formulas has ceased to be kept up by the controversies which accompanied their first introduction) a tendency to degenerate rapidly into lifeless dogmas; which tendency, all the efforts of an education expressly and skilfully directed to keeping [l]the[l] meaning alive, are barely [m] sufficient to counteract.

Considering, then, that the human mind, in different generations, occupies itself with different things, and in one age is led by the circumstances which surround it to fix more of its attention upon one of the properties of a thing, in another age upon another; it is natural and inevitable that in every age a certain portion of our recorded and traditional knowledge, not being continually [n]suggested[n] by the pursuits and inquiries with which mankind are at

[f-f]MS, 43, 46 entirely
[g-g]MS, 43 so much of both these things] 46 both these things in so great a degree
[h-h]+65, 68, 72
[i-i]+51, 56, 62, 65, 68, 72
[j-j]MS in
[k-k]MS, 43, 46 principles
[l-l]MS their
[m]MS, 43, 46, 51, 56, 62 found
[n-n]MS resuggested

that time engrossed, should fall asleep, as it were, and fade from the memory. It would be [o]in danger of being totally[o] lost, if the propositions or formulas, the results of the previous experience, did not remain, [p] as forms of words it may be, but of words that once really conveyed, and are still supposed to convey, a meaning: which meaning, though suspended, may be historically traced, and when suggested, [q]may be[q] recognised by minds of the necessary endowments as being still matter of fact, or truth. While the formulas remain, the meaning may at any time revive; and as on the one hand the formulas progressively lose the meaning they were intended to convey, so, on the other, when this forgetfulness has reached its height and begun to produce [r]obvious consequences[r], minds arise which from the contemplation of the [s]formulas[s] rediscover the [t]truth, when truth it was, which was contained in them[t], and announce it again to mankind, not as a discovery, but as the meaning of that which they have [u] been taught, and still profess to believe.

Thus there is a perpetual oscillation in spiritual [v] truths, and in spiritual doctrines of any significance, even when not truths. Their meaning is almost always in a process either of being lost or of being recovered [w]. Whoever has attended to the history of the more serious convictions of mankind—of the opinions by which the general conduct of their lives is, or as they conceive ought to be, more especially regulated—is aware that [x]even when recognising verbally the[x] same doctrines, they attach to them at different periods a greater or a less quantity, and even a different kind, of meaning. The words in their original acceptation connoted, and the propositions expressed, a complication of outward facts and inward feelings, to different portions of which the general mind is more particularly alive in different generations of mankind. To common minds, only that portion of the meaning is in each generation suggested, of which that generation possesses the counterpart in its own habitual experience. But the words and propositions lie ready to suggest to any mind duly prepared the remainder of the meaning. Such individual minds are almost always to be found: and the lost meaning, revived by them, again by degrees works its way into the general mind.

[y]The arrival of this salutary reaction may however be materially retarded

[o-o]MS, 43, 46 utterly
[p]MS did not continue to be repeated and believed in,] 43 and continue . . . *as* MS] 46 *as* 43 . . . and believed,
[q-q]MS, 43, 46 is
[r-r]MS, 43, 46 consequences of obvious evil
[s-s]MS formula
[t-t]MS old truth] 43, 46 whole truth
[u]MS, 43, 46 long
[v]51, 56, 62 (I do not mean religious)
[w]MS, 43 ; a remark upon which all history is a comment
[x-x]MS, 43, 46 while recognising verbally the very
[y-y]MS, 43, 46 There is scarcely anything which can materially retard the arrival of this salutary reaction, except

by[y] the shallow conceptions and incautious proceedings of mere logicians. It sometimes happens that towards the close of the downward period, when the words have lost part of their significance, and have not yet begun to recover it, persons arise whose leading and favourite idea is the importance of clear conceptions and precise thought, and the necessity, therefore, of definite language. These persons, in examining the old formulas, easily perceive that words are used in them without a meaning; and if they are not the sort of persons who are capable of rediscovering the lost signification, they naturally enough dismiss the formula, and define the name without [z] reference to it. In so doing they fasten down the name to what it connotes in common use at the time when it conveys the smallest quantity of meaning; and introduce the practice of employing it, consistently and uniformly, according to that connotation. The word in this way acquires an extent of denotation far beyond what it had before; it [a]becomes[a] extended to many things to which it was previously, in appearance capriciously, refused. Of the propositions in which it was formerly used, those which were true in virtue of the forgotten part of its meaning are now, by the clearer light which the definition diffuses, seen not to be true according to the definition; which, however, is the recognised and sufficiently correct expression of all that is perceived to be in the mind of any one by whom the term is used at the present day. The ancient formulas are consequently treated as prejudices; [b]and[b] people are no longer taught as before, though not to understand them, yet to believe that there is truth in them. They no longer remain in [c]the general mind[c] surrounded by respect, and ready at any time to suggest their original meaning. [d]Whatever truths they contain[d] are not only, [e]in[e] these circumstances, rediscovered far more slowly, but, when rediscovered, the prejudice with which novelties are regarded is now, in some degree at least, against them, instead of being on their side.

An example may make these remarks more intelligible. In all ages, except where moral speculation has been silenced by outward compulsion, or where the feelings which prompt to it [f]still continue to be satisfied by the traditional doctrines of an established faith[f], one of the subjects which have most occupied the minds of thinking [g]persons[g] is the inquiry, What is virtue? or, What is a virtuous character? Among the different theories on the subject

[z]MS, 43 any
[a-a]MS comes to be
[b-b]+43, 46, 51, 56, 62, 65, 68, 72
[c-c]MS, 43, 46 men's minds
[d-d]MS, 43, 46 The truths which they convey] 51, 56, 62, 65 When they contain truths, those truths
[e-e]MS, 43, 46 under
[f-f]MS, 43, 46 have received full satisfaction from an established faith unhesitatingly acquiesced in
[g-g]MS, 43, 46 men

which have, at different times, grown up and obtained [h]partial[h] currency, every one of which reflected as in the clearest mirror, the express image of the age which gave it birth; there was one, [i] according to which virtue [j]consists[j] in a correct calculation of our own personal interests, either in this world only, or also in [k]another[k]. [l]To make this theory plausible, it was of course necessary[l] that the only beneficial actions which people in general were [m]accustomed to see, or were therefore[m] accustomed to praise, should be such as were, or at least might without contradicting obvious facts be supposed to be, the result of [n]a prudential regard to self-interest; so that[n] the words really connoted no more, in common acceptation, than was set down in the definition [o].

Suppose, now, that the partisans of this theory had contrived to introduce [p] a consistent and undeviating use of the term according to this definition. Suppose that they had [q]seriously endeavoured, and had succeeded in the endeavour, to banish the word disinterestedness from the language; had obtained[q] the disuse of all expressions attaching odium to selfishness or commendation to self-sacrifice, or which implied generosity or kindness to be anything but doing a benefit in order to receive a greater [r]personal[r] advantage in return. Need we say that this abrogation of the old formulas for the sake of preserving clear ideas and consistency of thought, would have been [s]a great[s] evil? while the very inconsistency incurred by the coexistence of the formulas with philosophical opinions which [t]seemed to condemn[t] them as absurdities, operated as a stimulus to the re-examination of the subject; and thus the very doctrines originating in the oblivion into which [u]a part of the truth had fallen, were rendered indirectly, but powerfully, instrumental to its revival[u].

[h-h]+51, 56, 62, 65, 68, 72
[i]MS, 43, 46 brought forth by the latter half of the eighteenth century,
[j-j]MS, 43, 46 consisted
[k-k]MS, 43, 46 the next
[l-l]MS, 43, 46 There probably had been no era in history, except the declining period of the Roman empire, in which this theory could have grown up and made many converts. It could only have originated in an age essentially unheroic. It was a condition of the existence of such a theory,
[m-m]MS, 43, 46 much accustomed . . . therefore much
[n-n]MS, 43, 46 the motive above characterized. Hence
[o]MS, 43, 46 : to which consequently no objection lay on the score of deviation from usage, if the usage of that age alone was to be considered
[p]MS, 43, 46 (as, to do them justice, they showed themselves sufficiently inclined)
[q-q]MS, 43, 46 succeeded in banishing the word disinterestedness from the language, in obtaining
[r-r]+51, 56, 62, 65, 68, 72
[s-s]MS, 43, 46 an incalculable
[t-t]MS, 43, 46 virtually condemned
[u-u]MS, 43, 46 great moral truths had fallen . . . to the revival of those truths

The doctrine [v] of [w]the Coleridge school[w], that the language of any people among whom culture is of old date, is a sacred deposit, the property of all ages, and which no one age should consider itself empowered to alter—[x][y]borders indeed, as thus expressed, on[y] an extravagance; but it is grounded on a truth, frequently overlooked by[x] that class of logicians who think more of having a clear than of having a [z]comprehensive[z] meaning; and who perceive that every age is adding to the truths which it has received from its predecessors, but fail to see that a counter process of losing truths already possessed, is also constantly going on, and requiring the most sedulous attention to counteract it. Language is the depository of the accumulated body of experience to which all former ages have contributed their part, and which is the inheritance of all yet to come. We have no right to prevent ourselves from transmitting to posterity a larger portion of this inheritance than we may ourselves have profited by. [a][b]However much we may be able to improve on the conclusions of our forefathers,[b] we ought to be careful not inadvertently to let any of their premises slip through our fingers. It may be good to alter the meaning of a word, but it is bad to let any part of the meaning drop. Whoever seeks to introduce a more correct use of a term [c]with which important associations are connected[c], should be required to possess[a] [d]an accurate[d] acquaintance with the history of the particular word, and of the opinions which in different stages of its progress it served to express. To be qualified to define the name, we must know all that has ever been known of the properties of the class of objects which are, or originally were, denoted by it. For if we give it a meaning according to which any proposition will be false which [e]has ever been generally[e] held to be true, it is [f] incumbent on us to be sure that we know [g]and have considered[g] all which those, who believed the proposition, understood by it.

[v]MS, 43, 46 , therefore,
[w-w]MS Coleridge and his disciples
[x-x]MS, 43, 46 is far from being so devoid of important truth as it appears to
[y-y]51, 56 is indeed, as thus expressed,
[z-z]MS, 43, 46 complete
[a-a]MS, 43, 46 We continually have cause to give up the opinions of our forefathers; but to tamper with their language, even to the extent of a word, is an operation of much greater responsibility, and implies as an indispensable requisite,
[b-b]51, 56, 62, 65 We can often improve greatly on the conclusions of our forefathers; but
[c-c]+68, 72
[d-d]MS a profound
[e-e]MS, 43, 46 philosophers or mankind have ever
[f]MS, 43, 46 at least
[g-g]+51, 56, 62, 65, 68, 72

CHAPTER V

[a]On[a] the Natural History of the Variations in the Meaning of Terms

§ 1. *[How circumstances originally accidental become incorporated into the meaning of words]* It is not only in the mode which has now been pointed out, namely by gradual inattention to a portion of the ideas conveyed, that words in common use are liable to shift their connotation. The truth is, that the connotation of such words is perpetually varying; as might be expected from the manner in which words in common use acquire their connotation. A technical term, invented for purposes of art or science, has, from the first, the connotation given to it by its inventor; but a name which is in every one's mouth before any one thinks of defining it, derives its connotation only from the circumstances which are habitually brought to mind when it is pronounced. Among these circumstances, the properties common to the things denoted by the name, have naturally a principal place; and would have the sole place, if language were regulated by convention rather than by custom and accident. But besides these common properties, which if they exist are [b]*certainly*[b] present whenever the name is [c]employed[c], any other circumstance may *casually* be found along with it, so frequently as to become associated with it in the same manner, and as strongly, as the common properties themselves. In proportion as this association forms itself, people give up using the name in cases in which those casual circumstances do not exist. They prefer using some other name, or the same name with some adjunct, rather than employ an expression which will [d] call up an idea they do not want to excite. The circumstance originally casual, thus becomes regularly a part of the connotation of the word.

It is this continual incorporation of circumstances originally accidental, into the permanent signification of words, which is the cause that there are so few exact synonymes. It is this also which renders the dictionary meaning of a word, by universal remark so imperfect an exponent of its real meaning.

[a-a]MS, 43, 46, 51 Of
[b-b]MS, 43, 46, 51, 56, 62, 65 *necessarily*
[c-c]MS, 43, 46 applied] 51 implied *[printer's error?]*
[d]MS, 43, 46, 51, 56, 62, 65 necessarily

The dictionary meaning is marked out in a broad, blunt way, and probably includes all that was originally necessary for the correct employment of the term; but in process of time so many collateral associations adhere to words, that whoever should attempt to use them with no other guide than the dictionary, would confound a thousand nice distinctions and subtle shades of meaning which dictionaries take no account of; as we notice in the use of a language in conversation or writing by a foreigner not thoroughly master of it. The history of a word, by showing the [e]causes[e] which [f]determine[f] its use, is in these cases a better guide to its employment than any definition; for definitions can only show its meaning at the particular time, or at most the series of its successive meanings, but its history may show the law by which the succession was produced. The word *gentleman*, for instance, to the correct employment of which a dictionary would be no guide, originally meant simply a man [g]born in a certain rank[g]. From this it came by degrees to connote all such qualities or adventitious circumstances as were usually found to belong to persons of [h]that rank[h]. This consideration at once explains why in one of its vulgar acceptations it means any one who lives without labour, in another without manual labour, and in its more elevated signification it has in every age signified the conduct, character, habits, and outward appearance, in whomsoever found, which, according to the ideas of that age, belonged or were expected to belong to persons born and educated in a high social position.

It continually happens that of two words, whose dictionary meanings are either the same or very slightly different, one will be the proper word to use in one set of circumstances, another in another, without its being possible to show how the custom of so employing them originally grew up. The accident that one of the words was used and not the other on a particular occasion or in a particular social circle, will be sufficient to produce so strong an association between the word and some speciality of circumstances, that mankind abandon the use of it in any other case, and the speciality becomes part of its signification. The tide of custom first drifts the word on the shore of a particular meaning, then retires and leaves it there.

An instance in point is the remarkable change which, in the English language at least, has taken place in the signification of the word *loyalty*. That word originally meant in English, as it still means in the language from whence it came, fair, open dealing, and fidelity to engagements; in that sense the quality it expressed was part of the ideal chivalrous or knightly character. By what process, in England, the term became restricted to the single case of fidelity to the throne, I am not sufficiently versed in the history of courtly

[e-e]56 cause [*printer's error?*]
[f-f]MS, 43, 46, 51, 56, 62, 65 determined
[g-g]MS, 43, 46 of family
[h-h]MS, 43, 46 family

language to be able to pronounce. The interval between a *loyal chevalier* and a loyal subject is certainly great. I can only suppose that the word was, at some period, the favourite term at court to express fidelity to the oath of allegiance; until at length those who wished to speak of any other, and as it was probably [i]deemed[i], inferior sort of fidelity, either did not venture to use so dignified a term, or found it convenient to employ some other in order to avoid being misunderstood.

§ 2. [*Sometimes these originally accidental circumstances become the whole meaning of words*] Cases are not unfrequent in which a circumstance, at first casually incorporated into [a]the[a] connotation of a word which originally had no reference to it, in time wholly supersedes the original meaning, and becomes not merely a part of the connotation, but the whole of it. This is exemplified in the word pagan, *paganus*; which originally, as its etymology imports, was equivalent to *villager*; the inhabitant of a *pagus*, or village. At a particular era in the extension of Christianity over the Roman empire, the adherents of the old religion, and the villagers or country people, were nearly the same body of individuals, the inhabitants of the towns having been earliest converted; as in our own day, and at all times, the greater activity of social intercourse renders them the earliest recipients of new opinions and modes, while old habits and prejudices linger longest among the country people: not to mention that the towns were more immediately under the direct influence of the government, which at that time had embraced Christianity. From this casual coincidence, the word *paganus* carried with it, and began more and more steadily to suggest, the idea of a worshipper of the ancient divinities; until at length it suggested that idea so forcibly that people who did not desire to suggest the idea avoided using the word. But when *paganus* had come to connote heathenism, the very unimportant circumstance, with reference to that fact, of the place of residence, was soon disregarded in the employment of the word. As there was seldom any occasion for making [b]separate assertions[b] respecting heathens who lived in the country, there was no need for a separate word to denote them; and pagan came not only to mean heathen, but to mean that exclusively.

A case still more familiar to most readers is that of the word *villain* or *villein*. This term, as everybody knows, had in the middle ages a connotation as strictly defined as a word could have, being the proper legal designation for those persons who were the subjects of the [c]less onerous forms of feudal bondage[c]. The scorn of the semibarbarous military aristocracy for these their

[i-i]MS, 43, 46 considered
[a-a]56 a [*printer's error?*]
[b-b]MS a separate assertion] 43 separate assertion [*printer's error* 43?]
[c-c]MS, 43 least onerous form of feudal bondage, those serfs who were *adscripti glebæ*

abject dependants, rendered the act of likening any person to this class of [d]people[d] a mark of the greatest contumely: the same scorn led them to ascribe to the same people all manner of hateful qualities, which doubtless also, in the degrading situation in which they were held, were often not unjustly imputed to them. These circumstances combined to attach to the term villain, ideas of crime and guilt, in so forcible a manner that the application of the epithet even to those to whom it legally belonged became an affront, and was abstained from whenever no affront was intended. From that time [e] guilt was part of the connotation; and soon became the whole of it, since mankind were not prompted by any urgent motive to continue making a distinction in their language between bad men of servile station and bad men of any other rank in life.

These and similar instances in which the original signification of a term is totally lost—another and an entirely distinct meaning being first engrafted upon the former, and finally substituted for it—[f]afford[f] examples of the double movement which is always taking place in language: [g]two[g] counter-movements, one of Generalization, by which words are perpetually losing portions of their connotation, and becoming of less meaning and more general acceptation; the other of Specialization, by which other, or even these same words, are continually taking on fresh connotation; acquiring additional meaning, by being restricted in their employment to a part only of the occasions on which they might properly be used before. This double movement is of sufficient importance in the natural history of language, (to which natural history the artificial modifications ought always to have some degree of reference,) to justify our dwelling [h] a little longer on the nature of the twofold phenomenon, and the causes to which it owes its existence.

§ 3. [*Tendency of words to become generalized*] To begin with the movement of generalization. It [a]might seem[a] unnecessary to dwell on the changes in the meaning of names which take place merely from their being used ignorantly, by persons who, not having properly mastered the received connotation of a word, apply it in a looser and wider sense than belongs to it. This, however, is a real source of alterations in the language; for when a word, from being often employed in cases where one of the qualities which it connotes does not exist, ceases to suggest that quality with certainty, then even those who are under no mistake as to the proper meaning of the word, prefer expressing that meaning in some other way, and leave the original word to its fate. The word 'Squire as standing for an owner of a landed estate;

[d-d]MS, 43, 46 men
[e]MS the
[f-f]MS present
[g-g]MS, 43, 46, 51, 56 the
[h]MS, 43, 46, 51, 56 for
[a-a]MS, 43, 46, 51, 56, 62, 65, 68 is

Parson, as denoting not the rector of the parish, but clergymen in general; Artist, to denote only a painter or sculptor; are cases in point. [b]Such cases give a clear insight into the process of the degeneration of languages in periods of history when literary culture was suspended; and we are now in danger of experiencing a similar evil through the superficial extension of the same culture. So many persons without anything deserving the name of education have become writers by profession, that written language may almost be said to be principally wielded by persons ignorant of the proper use of the instrument, and who are spoiling it more and more for those who understand it. Vulgarisms, which creep in nobody knows how, are daily depriving the English language of valuable modes of expressing thought. To take a present instance: the verb *transpire* formerly conveyed very expressively its correct meaning, viz. to *become known* through unnoticed channels—to exhale, as it were, into publicity through invisible pores, like a vapour or gas disengaging itself. But of late a practice has commenced of employing this word, for the sake of finery, as a mere synonym of *to happen*: "the events which have *transpired* in the Crimea," meaning the incidents of the war. This vile specimen of bad English is already seen in the despatches of noblemen and viceroys: and the time is apparently not far distant when nobody will understand the word if used in its proper sense. [c]In other cases it is not the love of finery, but simple want of education, which makes writers employ words in senses unknown to genuine English. The use of "aggravating" for "provoking," in my boyhood a vulgarism of the nursery, has crept into almost all newspapers, and into many books; and when the word is used in its proper sense, as when writers on criminal law speak of aggravating and extenuating circumstances, their meaning, it is probable, is already misunderstood.[c] It is a great error to think that these corruptions of language do no harm. Those who are struggling with the difficulty (and who know by experience how great it already is) of expressing oneself clearly with precision, find their resources continually narrowed by illiterate writers, who seize and twist from its purpose some form of speech which once served to convey briefly and compactly an unambiguous meaning. It would hardly be believed how often a writer is compelled to a circumlocution by the single vulgarism, introduced during the last few years, of using the word *alone* as an adverb, *only* not being fine enough for the rhetoric of ambitious ignorance. A man will say "to which I am not alone bound by honour but also by law," unaware that what he has unintentionally said is, that he is *not alone* bound, some other person being bound with him. Formerly if any one said, "I am not alone responsible for this," he was understood to mean, (what alone his words mean in correct English,) that he is not the sole person responsible; but if he now used such an expres-

[b-b]+56, 62, 65, 68, 72 [*appears as footnote in* 56, 62, 65, 68]
[c-c]+72

sion, the reader would be confused between that and two other meanings; that he is not *only responsible* but something more; or that he is responsible *not only for this* but for something besides. The time is coming when Tennyson's Œnone could not say, "I will not die alone,"[*] lest she should be supposed to mean that she would not only die but do something else.

The blunder of writing *predicate* for *predict* has become so widely diffused that it bids fair to render one of the most useful terms in the scientific vocabulary of Logic unintelligible. [d]The mathematical and logical term "to eliminate" is undergoing a similar destruction. All who are acquainted either with the proper use of the word or with its etymology, know that to eliminate a thing is to thrust it out: but those who know nothing about it, except that it is a fine-looking phrase, use it in a sense precisely the reverse, to denote, not turning anything out, but bringing it in. They talk of *eliminating* some truth, or other useful result, from a mass of details.*[d b] [g] [h]A similar permanent deterioration in the language is in danger of being produced by the blunders of translators. The writers of telegrams, and the foreign correspondents of newspapers, have gone on so long translating *demander* by "to demand," without a suspicion that it means only to ask, that (the context generally showing that nothing else is meant) English readers are gradually associating the English word demand with simple asking, thus leaving the language without a term to express a demand in its proper sense. In like manner, "transaction," the French word for a compromise, is translated into the English word transaction; while, curiously enough, the inverse change is taking place in France, where the word "compromis" has lately begun to be used for expressing the same idea. If this continues, the two countries will have exchanged phrases.[h]

[i] Independently, however, of the generalization of names through their ignorant misuse, there is a tendency in the same direction consistently with

[*"Œnone," in *Poems*. London: Moxon, 1833 [1832], p. 63; l. 245.]

*[56] [e]Though no [f]such evil consequences as take place in these instances, are[f] likely to arise from the modern freak of writing *sanatory* instead of sanitary, it deserves notice as a charming specimen of pendantry engrafted upon ignorance. Those who thus undertake to correct the spelling of the classical English writers, are not aware that the meaning of *sanatory*, if there were such a word in the language, would have reference not to the preservation of health, but to the cure of disease.[e]

[d-d]+62, 65, 68, 72

[e-e]56, 62, 65, 68 [*appears as concluding paragraph of footnote indicated in variant* [b-b] *above*]

[f-f]56 similar inconvenience is

[g]62, 65, 68 I suspect that this error must at first have arisen from some confusion between *to eliminate* and *to enucleate*. [*appears as final sentence of penultimate paragraph of footnote, i.e., before paragraph indicated in variant* [e-e] *above*]

[h-h]+72

[i]MS, 43, 46, 51, 56, 62, 65, 68 [*no paragraph*]

[j]a perfect[j] knowledge of their meaning; arising from the fact, that the number of things known to us, and of which we feel a desire to speak, multiply faster than the names for them. Except on subjects for which there has been constructed a scientific terminology, with which unscientific persons do not meddle, great difficulty is generally found in bringing a new name into use; and independently of that difficulty, it is natural to prefer giving to a new object a name which at least expresses its resemblance to something already known, since by predicating of it a name entirely new we at first convey no information. In this manner the name of a species often becomes the name of a genus; as *salt*, for example, or *oil*; the former of which words originally denoted only the muriate of soda, the latter, as its etymology indicates, only olive oil; but which now denote large and diversified classes of substances resembling these in some of their qualities, and connote only those common qualities, instead of the whole of the distinctive properties of olive oil and sea salt. The words *glass* and *soap* are used by modern chemists in a similar manner, to denote genera of which the substances vulgarly so called are single species. [k] And it often happens, as in those instances, that the term keeps its special signification in addition to its more general one, and becomes ambiguous, that is, two names instead of one.

These changes, by which words in ordinary use become more and more generalized, and less and less expressive, take place in a still greater degree with the words which express the complicated phenomena of mind and society. Historians, travellers, and in general those who speak or write concerning moral and social phenomena with which they are not familiarly acquainted, are the great agents in this modification of language. The vocabulary of all except unusually instructed [l]as well as thinking[l] persons, is, on such subjects, eminently scanty. They have a certain small set of words to which they are accustomed, and which they employ to express phenomena the most heterogeneous, because they have never sufficiently analysed the facts to which those words correspond in their own country, to have attached perfectly definite ideas to the words. The first English conquerors of Bengal, for example, carried with them the [m]phrase[m] *landed proprietor* into a country where the rights of individuals over the soil were extremely different in degree, and even in nature, from those recognised in England [n]. Applying[n]

[j-j]MS, 43 the most thorough

[k]MS, 43 [*footnote:*] *"The term *alkali*, in its original sense, signified that particular residuum which was alone obtained by lixiviating the ashes of the plant named *kali*, but the word is now so generalized, that it denotes *any* body possessed of a certain number of properties." [John] Paris's *Pharmacologia* [5th ed. 2 vols. London: Phillips, 1822], Vol. I, p. 68.] 46, 51 *as* MS . . . which was obtained . . . *as* MS [Source *as* MS]

[l-l]+51, 56, 62, 65, 68, 72

[m-m]MS word

[n-n]MS ; and applying

the term with all its English associations in such a state of things; to one who had only a limited right they gave an absolute right, from another because he had not an absolute right they took away all right, drove whole classes of [o]people[o] to ruin and despair, filled the country with banditti, created a feeling that nothing was secure, and produced, with the best intentions, a disorganization of society [p]which had not been[p] produced in that country by the most ruthless of its barbarian invaders. [q] Yet the usage of persons capable of so gross a misapprehension determines the meaning of language; and the words they thus misuse grow in generality, until the instructed are obliged to acquiesce; and to employ those words (first freeing them from vagueness by giving them a definite connotation) as generic terms, subdividing the genera into species.

§ 4. [*Tendency of words to become specialized*] While the more rapid growth of ideas than of names thus creates a perpetual necessity for making the same names serve, even if imperfectly, on a greater number of occasions; a counter-operation is going on, by which names become on the contrary restricted to fewer occasions, by taking on, as it were, additional connotation, from circumstances not originally included in the meaning, but which have become connected with it in the mind by some accidental cause. We have seen above, in the words *pagan* and *villain*, remarkable examples of the specialization of the meaning of words from casual associations, as well as of the generalization of it in a new direction, [a] which often follows.

Similar specializations are of frequent occurrence in the history even of scientific nomenclature.

It is by no means uncommon, [says Dr. Paris, in his *Pharmacologia*,*] to find a word which is used to express general characters subsequently become the name of a specific substance in which such characters are predominant; and we shall find that some important anomalies in nomenclature may be thus explained. The term Αρσενικον, from which the word Arsenic is derived, was an ancient epithet applied to those natural substances which possessed strong and acrimonious properties, and as the poisonous quality of arsenic was found to be remarkably powerful, the term was especially applied to Orpiment, the form in which this metal most usually occurred. So the term *Verbena* (quasi *Herbena*) originally denoted all those herbs that were held sacred on account of their being employed in the rites of sacrifice, as we learn from the poets; but as *one* herb was usually adopted upon these occasions, the word Verbena came to denote that particular herb *only*, and it is transmitted to us to this day under the same title, viz., Verbena or Vervain,

*"Historical Introduction," Vol. I, pp. 66–8.

[o-o]MS, 43, 46 men
[p-p]MS never before
[q]MS, 43, 46, 51, 56 Paul Louis Courier might well say, "Gardez-nous de l'équivoque!"
[a]MS to a different class of objects,

and indeed until lately it enjoyed the medical reputation which its sacred origin conferred upon it, for it was worn suspended around the neck as an amulet. *Vitriol*, in the original application of the word, denoted *any* crystalline body with a certain degree of transparency (*vitrum*); it is hardly necessary to observe that the term is now appropriated to a particular species: in the same manner, Bark, which is a general term, is applied to express *one* genus, and by way of eminence it has the article *The* prefixed, as *The* bark: the same observation will apply to the word Opium, which, in its primitive sense, signifies *any* juice (ὀπὸς, *Succus*), while it now only denotes *one* species, viz., that of the poppy. So, again, *Elaterium* was used by Hippocrates to signify various internal applications, especially purgatives, of a violent and drastic nature (from the word ἐλαύνω, *agito, moveo, stimulo*), but by succeeding authors it was exclusively applied to denote the active matter which subsides from the juice of the wild cucumber. The word *Fecula*, again, originally meant to imply *any* substance which was derived by spontaneous subsidence from a liquid (from *fæx*, the grounds or settlement of *any* liquor); afterwards it was applied to Starch, which is deposited in this manner by agitating the flour of wheat in water; and lastly, it has been applied to a peculiar vegetable principle, which, like starch, is insoluble in cold, but completely soluble in boiling water, with which it forms a gelatinous solution. This indefinite meaning of the word *fecula* has created numerous mistakes in pharmaceutic chemistry; Elaterium, for instance, is said to be *fecula*, and, in the original sense of the word, it is properly so called, inasmuch as it is procured from a vegetable juice by spontaneous subsidence, but in the limited and modern acceptation of the term, it conveys an erroneous idea; for instead of the active principle of the juice residing in *fecula*, it is a peculiar proximate principle, *sui generis*, to which I have ventured to bestow the name of *Elatin*. For the same reason, much doubt and obscurity involve the meaning of the word *Extract*, because it is applied *generally* to any substance obtained by the evaporation of a vegetable solution, and *specifically* to a peculiar proximate principle, possessed of certain characters, by which it is distinguished from every other elementary body.

A generic term is always liable to become thus limited to a single species, or even individual, if people have occasion to think and speak of that individual or species much oftener than of anything else which is contained in the genus [b]. Thus[b] by cattle, a stage-coachman will understand horses; beasts, in the language of agriculturists, stands for oxen; and birds, with some sportsmen, for partridges only. The law of language which operates in these trivial instances, is the very same in conformity to which the terms Θεός, Deus, and God, were adopted from Polytheism by Christianity, to express the single object of its own adoration [c]. Almost all the terminology of the Christian Church is made up of words originally used in a much more general acceptation: *Ecclesia*, Assembly; *Bishop*, Episcopus, Overseer; *Priest*, Presbyter, Elder; *Deacon*, Diaconus, Administrator; *Sacrament*, a vow of allegiance; *Evangelium*, good tidings; and some words, as *Minister*, are still used both in the general and in the limited sense. It would be interesting to trace the

[b-b]MS ; as,
[c]MS, 43, 46 , in lieu of the ancient and specially appropriated name Jehovah

progress by which *author* [d]came, in its most familiar sense,[d] to signify a writer, and ποιητής, or maker, a poet.

Of the incorporation into the meaning of a term, of circumstances accidentally connected with it at some particular period, as in the case of Pagan, instances might easily be multiplied. Physician (φυσικός, or naturalist) became, in England [e], synonymous with a healer of diseases, because until a comparatively late period medical practitioners were the only naturalists. *Clerc*, or clericus, a scholar, came to signify an ecclesiastic, because the clergy were for many centuries the only scholars.

Of all ideas, however, the most liable to cling by association to anything with which they have ever been connected by proximity, are those [f] of our pleasures and pains, or of the things which we habitually contemplate as sources of our pleasures or pains. The additional connotation, therefore, which a word soonest and most readily takes on, is that of agreeableness or painfulness, in their various kinds and degrees: of being a good or [g] bad thing; desirable or to be avoided; an object of hatred, of dread, [h] contempt, admiration, hope, or love. Accordingly there is hardly a [i]single name, expressive of any[i] moral or social fact calculated to call forth strong affections either of a favourable or of a hostile nature, which [j]does not carry[j] with it decidedly and irresistibly a connotation of those strong affections, or, at [k]the[k] least, of approbation or censure; insomuch that to employ those names in conjunction with others by which the contrary sentiments were expressed, would produce the effect of a paradox, or even a contradiction in terms. The baneful influence of [l]a[l] connotation thus acquired, on [m]the prevailing habits of thought, especially in morals and politics[m], has been well pointed out on many occasions by [n] Bentham. It gives rise to the fallacy of "question-begging names."[*] The very property which we are inquiring whether a thing possesses or not, has become so associated with the name of the thing as to be part of its meaning, insomuch that by merely uttering the name we assume the point which was to be made out: one of the most frequent sources of apparently self-evident propositions. [o]

[*See Jeremy Bentham. *The Book of Fallacies*. London: Hunt, 1824, p. 213.]

[d-d]MS, 43, 46, 51, 56, 62, 65 , in its most familiar sense, came
[e]MS, 43, 46, 51, 56, 62, 65 at least
[f]MS of a highly interesting nature; the ideas
[g]MS, 43, 46 a
[h]MS, 43, 46, 51, 56 of
[i-i]+43, 46, 51, 56, 62, 65, 68, 72
[j-j]MS possesses a name not carrying
[k-k]+43, 46, 51, 56, 62, 65, 68, 72
[l-l]MS, 43, 46 the
[m-m]MS, 43, 46 our reasonings and habits of thought
[n]MS Mr.
[o]MS [*paragraph*] There is still another mode in which the meaning of a name is

Without any further multiplication of examples to illustrate the changes which usage is continually making in the signification of terms, I shall add, as a practical rule, that the logician, not being able to prevent such transformations, should submit to them with a good grace when they are irrevocably effected, and if a definition is necessary, define the word according to its new meaning; retaining the former as a second signification, if it is needed, and if there [p]is[p] any chance of being able to preserve it either in the language

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apt to be specialized, sufficiently frequent to be worthy of being pointed out. We have often the choice between a more and a less general name for designating an object, either of them sufficiently answering the purpose of distinction. Thus we may say either *that dog*, or *that animal*; in many cases, *that creature*, or *that object*, would be sufficient. Now there is in many cases of frequent recurrence, a tendency, which grows as civilization advances, to adopt the practice of designating things by the most general words which with all the aids of context and gesture will suffice to point them out. Natural good taste, and still more the conventional quality which usurps its name, consist to a great degree in keeping certain aspects of things as much as possible out of sight; speaking of disagreeable things with the least possible suggestion of their disagreeable details, and of agreeable things with as little obtrusion as possible of the mere mechanism of their production, which, except in our scientific observations, is not what interests us in them, and the close contemplation of which generally diminishes their charm to the imagination. The practice thus grows up among cultivated people, of speaking of common things in a way much less literal and definite than is the custom of the vulgar; in a way which indicates the thing meant, with the faintest possible suggestion of its characteristic qualities; and the mere words used would often not suffice to convey the meaning, unless there were something in the accompanying circumstances to assist in exciting the idea. The vulgar, meanwhile, continue to use the appropriate, peculiar, and, if scientific fitness were the only thing to be considered, the best phraseology, because unambiguous; while, for purposes of refinement, ambiguity is often the very quality desired.

Now this practice of using more general terms where specific ones might have been employed, is constantly spoiling the general terms by rendering them specific. They become the terms particularly associated with the very specialities of meaning which it was desired not to suggest. An amusing instance is the anecdote of a lady of the court of Louis XIV, who having declared to her confessor that she felt esteem for a certain cavalier, (this being, it seems, the phrase of the day to express a meaning which persons usually prefer to convey by a circumlocution,) was asked by the priest, "Combien de fois vous a-t-il estimée?" which story, whether true or invented, got into circulation, and according to Voltaire, led to the abandonment of the phrase in that peculiar sense. But if it had not been abandoned in that sense, it would soon have been discarded in its other sense; and finally, perhaps, lost altogether, because when confined to that particular meaning, it would no longer have had the indistinctness which constituted its delicacy. Many terms, in many different languages, which originally had a more general meaning, have been unfitted for other uses by acquiring this very connotation. And a vast variety of other words, without any relation to that peculiar subject, have one after another fallen into disuse except among the coarse and uncultivated, because they had come to connote too directly and unequivocally something which people did not like to have brought so distinctly before their imagination.] 43, 46 *as* MS . . . cases of frequent occurrence, a . . . *as* MS . . . keeping some aspects . . . *as* MS . . . suggest. A ridiculous instance . . . *as* MS . . . who having stated to . . . *as* MS . . . circulation, and led to . . . *as* MS . . . peculiar sense. If it . . . *as* MS . . . discarded in any other . . . *as* MS . . . indistinctness which formed its recommendation. Many . . . *as* MS . . . brought very distinctly . . . *as* MS

[p-p]MS, 43, 46, 51 be

of philosophy or in common use. Logicians cannot *make* the meaning of any but scientific terms: that of all other words is made by the collective human race. But logicians can ascertain clearly what it is which, working obscurely, has guided the general mind to a particular employment of a name; and when they have found this, they can clothe it in such distinct and permanent terms, that mankind [q]shall[q] see the meaning which before they only felt, and [r]shall[r] not suffer it to be afterwards forgotten or misapprehended. [s]

[q-q]MS now] 51 can
[r-r]MS will
[s]MS, 43, 46 And this is a power not lower in dignity, and far less liable to abuse, than the chimerical one of domineering over language.

CHAPTER VI

The Principles of a Philosophical Language Further Considered

§ 1. [*Second requisite of philosophical language, a name for every important meaning*] We have, thus far, considered only one of the requisites of a language adapted for the investigation of truth; that its terms shall each of them convey a determinate and unmistakeable meaning. There are, however, as we have already remarked, other requisites; some of them important only in the second degree, but one which is fundamental, and barely yields in point of importance, if it yields at all, to the quality which we have already discussed at so much length. That the language may be fitted for its purposes, not only should every word perfectly express its meaning, but there should be no important meaning without its word. Whatever we have occasion to think of often, and for scientific purposes, ought to have a name appropriated to it.

This requisite of philosophical language may be considered under three different heads; that number of separate conditions being involved in it.

§ 2. [*Having a name for every important meaning implies, first, an accurate descriptive terminology*] First: there ought to be all such names, as are needful for making such a record of individual observations that the words of the record shall exactly show what fact it is which has been observed. In other words, there [a]should[a] be an accurate Descriptive Terminology.

The only things which we can observe directly being our own sensations, or other feelings, a complete descriptive language would be one in which there should be a name for every variety of elementary sensation or feeling. Combinations of sensations or feelings may always be described, if we have a name for each of the elementary feelings which compose them; but brevity of description, [b]and clearness (which often depends very much on brevity,) are[b] greatly promoted by giving distinctive names not to the elements alone, but also to all combinations which are of frequent recurrence. On this occa-

[a-a]MS, 43, 46 must
[b-b]MS, 43, 46, 51 as well as clearness . . . brevity,) is

sion I cannot do better than quote from Dr. Whewell* some of the excellent remarks which he has made on this important branch of our subject.

The meaning [c] of [descriptive] technical terms can be fixed in the first instance only by convention, and can be made intelligible only by presenting to the senses that which the terms are to signify. The knowledge of a colour by its name can only be taught through the eye. No description can convey to a hearer what we mean by *apple-green* or *French-grey*. It might, perhaps, be supposed that, in the first example, the term *apple*, referring to so familiar an object, sufficiently suggests the colour intended. But it may easily be seen that this is not true; for apples are of many different hues of green, and it is only by a conventional selection that we can appropriate the term to one special shade. When this appropriation is once made, the term refers to the sensation, and not to the parts of the term; for these enter into the compound merely as a help to the memory, whether the suggestion be a natural connexion as in 'apple-green,' or a casual one as in 'French-grey.' In order to derive due advantage from technical terms of this kind, they must be associated *immediately* with the perception to which they belong; and not connected with it through the vague usages of common language. The memory must retain the sensation; and the technical word must be understood as directly as the most familiar word, and more distinctly. When we find such terms as *tin-white* or *pinchbeck-brown*, the metallic colour so denoted ought to start up in our memory without delay or search.

This, which it is most important to recollect with respect to the simpler properties of bodies, as colour and form, is no less true with respect to more compound notions. In all cases the term is fixed to a peculiar meaning by convention; and the student, in order to use the word, must be completely familiar with the convention, so that he has no need to frame conjectures from the word itself. Such conjectures would always be insecure, and often erroneous. Thus the term *papilionaceous* applied to a flower is employed to indicate, not only a resemblance to a butterfly, but a resemblance arising from five petals of a certain peculiar shape and arrangement; and even if the resemblance were much stronger than it is in such cases, yet, if it were produced in a different way, as for example, by one petal, or two only, instead of a 'standard,' two 'wings,' and a 'keel' consisting of two parts more or less united into one, we should no longer be justified in speaking of it as a 'papilionaceous' flower.

When, however, the thing named is, as in this [d]last[d] case, a combination of simple sensations, it is not necessary, in order to learn the meaning of [e]the[e] word, that the student should refer back to the sensations themselves; it may be communicated to him through the medium of other words; the terms, in short, may be defined. But the names of elementary sensations, or elementary

*[56] *History of Scientific Ideas,* Vol. II, pp. 110–11. [*JSM's square brackets around* descriptive *in the quotation.*]

[c]MS, 43, 46, 51 " (says he*) " [*footnote:*] **Philosophy of the Inductive Sciences,* Vol. I, pp. 464–5. [*this reference is equivalent to that in the footnote immediately above*]

[d-d]+43, 46, 51, 56, 62, 65, 68, 72

[e-e]51, 56, 62, 65 a

feelings of any sort, cannot be defined; nor is there any [f]mode[f] of making their signification known but by making the learner experience the sensation, or referring him, through some known mark, to his remembrance of having experienced it before. Hence it is only the impressions on the outward senses, or those inward feelings which are connected in a very obvious and uniform manner with outward objects, that are really susceptible of an exact descriptive language. The countless variety of sensations which arise, for instance, from disease, or from peculiar physiological states, it would be in vain to attempt to name; for as no one can judge whether the sensation I have is the same with his, the name [g]cannot[g] have, to us two, [h]real[h] community of meaning. The same may be said, to a considerable extent, of purely mental feelings. But in some of the sciences which are conversant with external objects, it is scarcely possible to surpass the perfection to which this quality of a philosophical language has been carried.

The [i]formation*[i] of an exact and extensive descriptive language for botany has been executed with a degree of skill and felicity, which, before it was attained, could hardly have been dreamt of as attainable. Every part of a plant has been named; and the form of every part, even the most minute, has had a large assemblage of descriptive terms appropriated to it, by means of which the botanist can convey and receive knowledge of form and structure, as exactly as if each minute part were presented to him vastly magnified. This acquisition was part of the Linnæan reform. . . . 'Tournefort,' says Decandolle, 'appears to have been the first who really perceived the utility of fixing the sense of terms in such a way as always to employ the same word in the same sense, and always to express the same idea by the same word; but it was Linnæus who really created and fixed this botanical language, and this is his fairest claim to glory, for by this fixation of language he has shed clearness and precision over all parts of the science.'

It is not necessary here to give any detailed account of the terms of botany. The fundamental ones have been gradually introduced, as the parts of plants were more carefully and minutely examined. Thus the flower was successively distinguished into the *calyx*, the *corolla*, the *stamens*, and the *pistils*; the sections of the corolla were termed *petals* by Columna; those of the calyx were called *sepals* by Necker. Sometimes terms of greater generality were devised; as *perianth*, to include the calyx and corolla, whether one or both of these were present; *pericarp*, for the part enclosing the grain, of whatever kind it be, fruit, nut, pod, &c. And it may easily be imagined, that descriptive terms may, by definition and combination, become very numerous and distinct. Thus leaves may be called *pinnatifid*, *pinatipartite*, *pinnatisect*, *pinnatilobate*, *palmatifid*, *palmatipartite*, &c., and each of these words designates different combinations of the modes and extent of the divisions of the leaf with the divisions of its outline. In some cases, arbitrary numerical relations are introduced into the definition: thus, a leaf is called *bilo-*

**History of Scientific Ideas*, Vol. II, pp. 111–13.

[f-f]MS, 43, 46 means
[g-g]MS, 43, 46 may not
[h-h]MS, 43, 46, 51, 56, 62, 65 any
[i-i]MS, 43 formation" (continues Mr. Whewell*) "

bate, when it is divided into two parts by a notch; but if the notch go to the middle of its length, it is *bifid*; if it go near the base of the leaf, it is *bipartite*; if to the base, it is *bisect*. Thus, too, a pod of a cruciferous plant is a [j]*siliqua*[j], if it is four times as long as it is broad, but if it be shorter than this it is a *silicula*. Such terms being established, the form of the very complex leaf or frond of a fern [k](Hymenophyllum Wilsoni)[k] is exactly conveyed by the following phrase:—'fronds rigid pinnate, pinnæ recurved subunilateral, pinnatifid, the segments linear undivided or bifid spinuloso-serrate.'[*]

Other characters, as well as form, are conveyed with the like precision: Colour by means of a classified scale of colours. . . . This was done with most precision by Werner, and his scale of colours is still the most usual standard of naturalists. Werner also introduced a more exact terminology with regard to other characters which are important in mineralogy, as lustre, hardness. But Mohs improved upon this step by giving a numerical scale of hardness, in which talc is 1, gypsum 2, calc spar 3, and so on. . . . Some properties, as specific gravity, by their definition give at once a numerical measure; and others, as crystalline form, require a very considerable array of mathematical calculation and reasoning, to point out their relations and gradations.

§ 3. [*Having a name for every important meaning implies, secondly, a name for each of the more important results of scientific abstraction*] Thus far of Descriptive Terminology, or of the language requisite for placing on record our observation of individual instances. But when we proceed from this to Induction, or rather to that comparison of observed instances which is the preparatory step towards it, we stand in need of an additional and a different sort of general names.

Whenever, for purposes of Induction, we find it necessary to introduce (in Dr. Whewell's phraseology) some new general conception; that is, whenever the comparison of a set of phenomena leads to the recognition in them of some common circumstance, which, our attention not having been directed to it on any former occasion, is to us a new phenomenon; it is of importance that this new conception, or this new result of abstraction, should have a name appropriated to it; especially if the circumstance it involves be one which leads to many consequences, or which is likely to be found also in other classes of phenomena. No doubt, in most cases of the kind, the meaning might be conveyed by joining together several words already in use. But when a thing has to be often spoken of, there are more reasons than the saving of time and space, for speaking of it in the most concise manner possible. What darkness would be spread over geometrical [a]demonstrations[a], if wherever the word *circle* is used, the definition of a circle were inserted in-

[*Whewell is quoting William Jackson Hooker. *The British Flora*. London: Longman, 1830, p. 450.]

[j-j]Source, MS, 43, 46, 51, 56 *silica*
[k-k]MS, 43 [*in footnote, added by JSM; not in* Source]
[a-a]MS, 43 demonstration

stead of it. In mathematics and its applications, where the nature of the processes demands that the attention should be strongly concentrated, but does not require that it should be widely diffused, the importance of concentration also in the expressions has always been duly felt; and a mathematician no sooner finds that he shall often have occasion to speak of the same two things together, than he at once creates a term to express them whenever combined: just as, in his algebraical operations, he substitutes for $(a^m + b^n)\frac{p}{q}$, or for $\frac{a}{b} + \frac{b}{c} + \frac{c}{d}$ + &c., the single letter P, Q, or S; not solely to shorten his symbolical expressions, but to simplify the purely intellectual part of his operations, by enabling the mind to give its exclusive attention to the relation between the quantity S and the other quantities which enter into the equation, without being distracted by thinking unnecessarily of the parts of which S is itself composed.

But there is another reason, in addition to that of promoting perspicuity, for giving a brief and compact name to each of the more considerable results of abstraction which are obtained in the course of our intellectual phenomena. By naming them, we fix our attention upon them; we keep them more constantly before the mind. The names are remembered, and being remembered, suggest their definition; while if instead of specific and characteristic names, the meaning had been expressed by putting together a number of other names, that particular combination of words already in common use for other purposes would have had nothing to make itself remembered by. If we want to render a particular combination of ideas permanent in the mind, there is nothing which clenches it like a name specially devoted to express it. If mathematicians had been obliged to speak of "that to which a quantity, in increasing or diminishing, is always approaching nearer, so that the difference becomes less than any assignable quantity, but to which it never becomes exactly equal," instead of expressing all this by the simple phrase, "the limit of a quantity," we should probably have long remained without most of the important truths which have been discovered by means of the relation between quantities of various kinds and their limits. If instead of speaking of *momentum*, it had been necessary to say, "the product of the number of units of velocity in the velocity by the number of units of mass in the mass," many of the dynamical truths now apprehended by means of this complex idea would probably have escaped notice, for want of recalling the idea itself with sufficient readiness and familiarity. And on subjects less remote from the topics of popular discussion, whoever wishes to draw attention to some new or unfamiliar distinction among things, will find no way so sure as to invent or select [b]suitable names[b] for the express purpose of marking it.

[b-b]MS a name

A volume devoted to explaining what [c]the writer means by civilization[c], does not raise so vivid a conception of it as the single expression, that Civilization is a different thing from Cultivation; the compactness of that brief designation for the contrasted quality being an equivalent for a long discussion. So, if we would impress forcibly upon the understanding and memory the distinction between [d]the two different conceptions of a representative government[d], we cannot more effectually do so than by saying that [e]Delegation is not Representation[e]. [f] Hardly any original thoughts on mental or social subjects ever make their way among mankind, or assume their proper importance in the minds even of their inventors, until aptly-selected words or phrases have, as it were, nailed them down and held them fast.

§ 4. [*Having a name for every important meaning implies, thirdly, a nomenclature, or system of the names of Kinds*] Of the three essential parts of a philosophical language, we have now mentioned two: a terminology suited for describing with precision the individual facts observed; and a name for every common property of any importance or interest, which we detect by comparing those facts: including (as the concretes corresponding to those abstract terms) names for the classes which we artificially construct in virtue of those properties, or as many of them, at least, as we have frequent occasion to predicate anything of.

But there is a sort of classes, for the recognition of which no such elaborate process is necessary; because each of them is marked out from all others not by some one property, the detection of which may depend on a difficult act of abstraction, but by its properties generally. I mean, the Kinds of things, in the sense which, in this treatise, has been [a]specially[a] attached to that term. By a Kind, it will be remembered, we mean one of those classes which are distinguished from all others not by one or a few definite properties, but by an unknown multitude of them: the combination of properties on which the class is grounded, being a mere index to an indefinite number of other distinctive attributes. The class horse is a Kind, because the things which agree in possessing the characters by which we recognise a horse, agree in a

[c–c]MS, 43, 46 civilization is and is not
[d–d]MS, 43, 46 what a representative government should be and what it often is
[e–e]MS, 43, 46 Representation is not Delegation
[f]MS Dr. Chalmers, in order to distinguish his scheme of clerical superintendence of a parish from the mere keeping a church open which people might come to or not as they chose, called very expressively the former the "aggressive" system, the latter the "attractive." [*See, e.g., Thomas Chalmers. *On the Use and Abuse of Literary and Clerical Endowments.* Glasgow: Collins, 1827, p. 118.] When the earlier electricians found that there were two different kinds of electrical excitement, they soon made the world familiar with them by giving them the names of positive and negative, or vitreous and resinous.] 43, 46 *as* MS . . . they spontaneously chose . . . negative, vitreous . . . *as* MS
[a–a]MS, 43, 46 systematically

great number of other properties, as we know, and, it cannot be doubted, in many more than we know. Animal, again, is a Kind, because no definition that could be given of the name animal could either exhaust the properties common to all animals, [b]or[b] supply premises from which the remainder of those properties could be inferred. But a combination of properties which does not give evidence of the existence of any other independent peculiarities, does not constitute a Kind. White horse, therefore, is not a Kind; because horses which agree in whiteness, do not agree in anything else, except [c]the qualities common to all horses, and[c] whatever may be the causes or effects of [d]that[d] particular colour.

On the principle that there should be a name for everything which we have frequent occasion to make assertions about, there ought evidently to be a name for every Kind; for as it is the very [e]meaning[e] of a Kind that the individuals composing it have an indefinite multitude of properties in common, it follows that, if not with our present knowledge, yet with that which we may hereafter acquire, the Kind is a subject to which there will have to be applied many predicates. The third component element of a philosophical language, therefore, is that there shall be a name for every Kind. In other words, there must not only be a terminology, but also a nomenclature.

The words Nomenclature and Terminology are employed by most authors almost indiscriminately; Dr. Whewell being, [f]as[f] far as I am aware, the first writer who has regularly assigned to the two words different meanings.[*] The distinction however which he has drawn between them being [g]real and important[g], his example is likely to be followed; and (as is apt to be the case when such innovations in language are felicitously made) a vague sense of the distinction is found to have influenced the employment of the terms in common [h]practice[h], before the expediency had been pointed out of discriminating them philosophically. Every one would say that the reform effected by Lavoisier and Guyton-Morveau in the language of chemistry consisted in the introduction of a new nomenclature, not of a new terminology. Linear, lanceolate, oval, or oblong, serrated, dentate, or crenate leaves, are expressions forming part of the terminology of botany, while the names "Viola odorata," and "Ulex Europæus," belong to its nomenclature.

A nomenclature may be defined, the collection of the names of all the Kinds with which any branch of knowledge is conversant; or more properly,

[*See *Novum Organon Renovatum*, pp. 21 (Aphorism lxxxviii), 23 (Aphorism xcviii), and 269ff.]

[b-b]MS, 43, 46 nor
[c-c]MS, 43 in the . . . and in
[d-d]MS the
[e-e]MS, 43, 46 nature
[f-f]MS so
[g-g]MS, 43, 46, 51 a real and an important one
[h-h]MS use

of all the lowest Kinds, or *infimæ species*—those which may be subdivided indeed, but not into Kinds, and which generally accord with what in natural history are termed simply species. Science [i]possesses[i] two splendid examples of a systematic nomenclature; that of plants and animals, constructed by Linnæus and his successors, and that of chemistry, which we owe to the illustrious group of chemists who flourished in France towards the close of the eighteenth century. In these two departments, not only has every known species, or lowest Kind, a name assigned to it, but when new lowest Kinds are discovered, names are at once given to them on an uniform principle. In other sciences the nomenclature is not at present constructed on any system, either because the species to be named are not numerous enough to require one, (as in geometry for example,) or because no one has yet suggested a suitable principle for such a system, as in mineralogy; in which the want of a scientifically constructed nomenclature is now the principal cause which retards the progress of the science.

§ 5. [*Peculiar nature of the connotation of names which belong to a nomenclature*] A word which carries on its face that it belongs to a nomenclature, seems at first sight to differ from other concrete general names in this—that its meaning does not reside in its connotation, in the attributes implied in it, but in its denotation, that is, in the particular group of things which it is appointed to designate; and cannot, therefore, be unfolded by means of a definition, but must be made known in another way. [a]This opinion[a], however, appears to me erroneous. Words belonging to a nomenclature differ, I conceive, from other words mainly in this, that besides the ordinary connotation, they have a peculiar one of their own: besides connoting certain attributes, they also connote that those attributes are distinctive of a Kind. The term "peroxide of iron," for example, belonging by its form to the systematic nomenclature of chemistry, bears on its face that it is the name of a peculiar Kind of substance. It moreover connotes, like the name of any other class, some portion of the properties common to the class; in this instance the property of being a compound of iron and the largest dose of oxygen with which iron will combine. These two things, the fact of being such a compound, and the fact of being a Kind, constitute the connotation of the name peroxide of iron. When we say of the substance before us, that it is the peroxide of iron, we thereby assert, first, that it is a compound of iron and a maximum of oxygen, and next, that the substance so composed is a peculiar Kind of substance.

Now, this second part of the connotation of any word belonging to a nomenclature is as essential a portion of its meaning as the first part, while

[i–i]MS presents
[a–a]MS, 43 Mr. Whewell seems to incline to this opinion, which

the definition [b]only declares[b] the first: and hence the appearance that the signification of such terms cannot be conveyed by a definition: which appearance, however, is fallacious. The name Viola odorata denotes a Kind, of which a certain number of characters, sufficient to distinguish it, are enunciated in botanical works. This enumeration of characters is surely, as in other cases, a definition of the name. No, say some, it is not a definition, for the name Viola odorata does not mean those characters; it means that particular group of plants, and the characters are selected from among a much greater number, merely as marks by which to recognise the group. [c]But to this I reply, that[c] the name does not mean that group, for it would be applied to that group no longer than while the group is believed to be an *infima species*; if it were to be discovered that several distinct Kinds have been confounded under this one name, no one would any longer apply the name Viola odorata to the whole of the group, but would apply it, if retained at all, to one only of the Kinds contained therein. What is imperative, therefore, is not that the name shall denote one particular collection of objects, but that it shall denote a Kind, and a lowest Kind. The form of the name declares that, happen what will, it is to denote an *infima species*; and that, therefore, the properties which it connotes, and which are expressed in the definition, are to be connoted by it no longer than while we continue to believe that those properties, when found together, indicate a Kind, and that the whole of them are found in no more than one Kind.

With the addition of this peculiar connotation, implied in the form of every word which belongs to a systematic nomenclature; the set of characters which is employed to discriminate each Kind from all other Kinds (and which is a real definition) constitutes as completely as in any other case the whole meaning of the term. It is no objection to say that (as is often the case in natural history) the set of characters may be changed, and another substituted as being better suited for the purpose of distinction, while the word, still continuing to denote the same group of things, is not considered to have changed its meaning. For this is no more than may happen in the case of any other general name: we may, in reforming its connotation, leave its denotation untouched; and it is generally desirable to do so. The connotation, however, is not the less for this the real meaning, for we at once apply the name wherever the characters set down in the definition are found; and that which exclusively guides us in applying the term, must constitute its signification. If we find, contrary to our previous belief, that the characters are not peculiar to one species, we cease to use the term coextensively with the characters; but then it is [d]because the other portion of the connotation[d] fails; the condi-

[b-b]MS, 43, 46, 51, 56, 62 can only declare
[c-c]MS, 43, 46 By no means, I reply;
[d-d]MS the other portion of the connotation which

tion that the class must be a Kind. The connotation, therefore, is still the meaning; the set of descriptive characters is a true definition; and the meaning is unfolded, not indeed (as in other cases) by the definition alone, but by the definition and the form of the word taken together.

§ 6. [*In what cases language may, and may not, be used mechanically*] We have now analysed what is implied in the two principal requisites of a philosophical language; first, precision, or definiteness, and secondly, completeness. Any further remarks on the mode of constructing a nomenclature must be deferred until we treat of Classification; the mode of naming the Kinds of things being necessarily subordinate to the mode of arranging those Kinds into [a]larger[a] classes. With respect to the minor requisites of terminology, some of them are well stated and [b] illustrated in the "Aphorisms [c]concerning[c] the Language of Science," included in Dr. Whewell's *Philosophy of the Inductive Sciences.*[*] These, as being of secondary importance in the peculiar point of view of Logic, [d]I shall not further refer to, but[d] shall confine [e]my[e] observations to one more quality, which, next to the two already treated of, appears to be the most valuable which the language of science can possess. Of this quality a general notion may be conveyed by the following aphorism:

Whenever the nature of the subject permits our reasoning [f]processes[f] to be, without danger, carried on mechanically, the language should be constructed on as mechanical principles as possible; while in the contrary case, it should be so constructed that there shall be the greatest possible obstacles to a merely mechanical use of it.

I am [g]aware[g] that this maxim requires much explanation, which I shall at once proceed to give. And first, as to what is meant by using a language mechanically. The complete or extreme case of the mechanical use of language, is when it is used without any consciousness of a meaning, and with only the consciousness of using certain visible or audible marks in conformity to technical rules previously laid down. This extreme case is [h] nowhere realized except in the figures of arithmetic, and [i]still more,[i] the symbols of algebra, a language unique in its kind, and approaching as nearly to per-

[*Vol. I, pp. xlviii–cxx; *Novum Organon Renovatum*, pp. 257–370.]

[a-a]+43, 46, 51, 56, 62, 65, 68, 72
[b]MS, 43, 46 copiously
[c-c]MS, 43, 46, 51, 56 on [Source *as* 62, 65, 68, 72]
[d-d]MS, 43 we shall leave the reader to seek in Mr. Whewell's pages, and] 46, 51, 56 *as* 72 . . . further allude to, and] 62 *as* 72 . . . to, and
[e-e]MS, 43 our own] 46 my own
[f-f]43, 46 process
[g-g]MS, 43, 46, 51 conscious
[h]MS, 43, 46, 51 , so far as I am aware,
[i-i]+72

fection, for the purposes to which it is destined, as can, perhaps, be said of any creation of the human mind. Its perfection consists in the completeness of its adaptation to a purely mechanical use. The symbols are mere counters, without even the semblance of a meaning apart from the convention which is renewed each time they are employed, and which is altered at each renewal, the same symbol *a* or *x* being used on different occasions to represent things which (except that, like all things, they are susceptible of being numbered) have no property in common. There is nothing, therefore, to distract the mind from the set of mechanical operations which are to be performed upon the symbols, such as squaring both sides of the equation, multiplying or dividing [j]them[j] by the same or by equivalent symbols, and so forth. Each of [k]these[k] operations, it is true, corresponds to a syllogism; represents one step of a ratiocination relating not to the symbols, but to the things signified by them. But as it has been found practicable to frame a technical form, by conforming to which we can make sure of finding the conclusion of the ratiocination, our end can be completely attained without our ever thinking of anything but the symbols. Being thus intended to work merely as mechanism, they have the qualities which mechanism ought to have. They are of the least possible bulk, so that they take up scarcely any room, and waste no time in their manipulation; they are compact, and fit so closely together that the eye can take in the whole at once of [l]almost[l] every operation which they are employed to perform.

These admirable properties of the symbolical language of mathematics have made so strong an impression on the minds of many [m]thinkers[m], as to have led them to consider the symbolical language in question as the ideal type of philosophical language generally; to think that names in general, or (as they are fond of calling them) signs, are fitted for the purposes of thought in proportion as they can be made to approximate to the compactness, the entire unmeaningness, and the capability of being used as counters without a thought of what they represent, which are characteristic of the *a* and *b*, the *x* and *y*, of algebra. This notion has led to sanguine views of the acceleration of the progress of science by means which, [n] I conceive, cannot possibly conduce to that end, and forms part of that exaggerated estimate of the influence of signs, which has contributed in no small degree to prevent the real laws of our intellectual operations from being [o] rightly understood.

In the first place, a set of signs [p]by which we reason[p] without consciousness of their meaning, can be serviceable, at most, only in our deductive operations. In our direct inductions we cannot for a moment dispense with

[j-j]+68, 72
[k-k]MS those
[l-l]+43, 46, 51, 56, 62, 65, 68, 72
[m-m]MS, 43, 46 philosophers
[n]MS, 43, 46, 51, 56, 62 as
[o]MS, 43, 46, 51 kept in view, or even
[p-p]MS which we reason by,

a distinct mental image of the phenomena, since the whole operation turns on a perception of the particulars in which those phenomena agree and differ. But, further, this reasoning by counters is only suitable to a very limited portion even of our deductive processes. In our reasonings respecting numbers, the only general principles which we ever have occasion to introduce, are these, Things which are equal to the same thing are equal to one another, and The sums or differences of equal things are equal; with their various corollaries. Not only can no hesitation ever arise respecting the applicability of these principles, since they are true of all magnitudes whatever; but every possible application of which they are susceptible, may be reduced to a technical rule; [q]and such[q], in fact, the rules of the calculus are. But if the symbols represent any other things than mere numbers, let us say even straight or curve lines, we have then to apply theorems of geometry not true of all lines without exception, and to select those which are true of the lines we are reasoning about. And how can we do this unless we keep completely in mind what particular lines these are? Since additional geometrical truths may be introduced into the ratiocination in any stage of its progress, we cannot suffer ourselves, during even the smallest part of it, to use the names mechanically (as we use algebraical symbols) without an image annexed to them. It is only after ascertaining that the solution of a question concerning lines [r]can be made to depend[r] on a previous question concerning numbers, or in other words after the question has been (to speak technically) reduced to an equation, that the unmeaning signs become available, and that the nature of the facts themselves to which the investigation relates can be dismissed from the mind. Up to the establishment of the equation, the language in which mathematicians carry on their reasoning does not differ in character from that employed by close reasoners on any other kind of subject.

I do not deny that every correct ratiocination, when thrown into the syllogistic shape, is conclusive from the mere form of the expression, provided none of the terms used be ambiguous; and this is one of the circumstances which have led some [s]writers[s] to think that if all names were so judiciously constructed and so carefully defined as not to admit of any ambiguity, the improvement thus made in language would not only give to the conclusions of every deductive science the same certainty with those of mathematics, but would reduce all reasonings to the application of a technical form, and enable their conclusiveness to be rationally assented to after a merely mechanical process, as is undoubtedly the case in algebra. But, if we except geometry, the conclusions of which are already as certain and exact

[q-q]MS, 43, 46, 51, 56 such as
[r-r]MS depends
[s-s]MS, 43, 46 philosophers

as they can be made, there is no [t]science but that of number, in which the practical validity[t] of a reasoning can be apparent to any person who has looked only at the [u]reasoning itself[u]. Whoever has [v]assented to[v] [w]what[w] was said in the last Book concerning the case of the Composition of Causes, and the still stronger case of the entire supersession of one set of laws by another, is aware that geometry and algebra are the only sciences of which the propositions are categorically true: the general propositions of all other sciences are true only hypothetically, supposing that no counteracting cause happens to interfere. A conclusion, therefore, however correctly deduced, in point of form, from admitted laws of nature, will have no other than an hypothetical certainty. At every step we must assure ourselves that no other law of nature has superseded, or intermingled its operation with, those which are the premises of the reasoning; and how can this be done by merely looking at the words? We must not only be constantly thinking of the phenomena themselves, but we must be constantly [x]studying[x] them; making ourselves acquainted with the peculiarities of every case to which we attempt to apply our general principles.

The algebraic notation, [y]considered as[y] a philosophical language, is perfect in its adaptation to the subjects for which it is commonly employed, namely those of which the investigations have already been reduced to the ascertainment of a relation between numbers. But, admirable as it is for its own purpose, the properties by which it is rendered such are so far from constituting it the ideal model of philosophical language in general, that the more nearly the language of any other branch of science approaches to it, the less fit that language is for its own proper functions. On all other subjects, instead of contrivances to prevent our attention from being distracted by thinking of the meaning of our signs, we [z]ought to wish for[z] contrivances to make it impossible that we should ever lose sight of that meaning even for an instant.

With this view, as much meaning as possible should be thrown into the formation of the word itself; the aids of derivation and analogy being made available to keep alive a consciousness of all that is signified by it. In this respect those languages have an immense advantage which form their compounds and derivatives from native roots, like the German, and not from those of a foreign or [a] dead language, as is so much the case with English, French, and Italian: and the best are those which form them according to fixed analogies, corresponding to the relations between the ideas to be ex-

[t-t]MS other science, that of number expected, in which the conclusiveness
[u-u]MS, 43, 46, 51, 56, 62, 65, 68 form of the process
[v-v]MS carefully followed
[w-w]43, 46, 51, 56 all that
[x-x]MS, 43, 46 looking at
[y-y]MS as] 43, 46 viewed as
[z-z]MS, 43, 46, 51 require
[a]MS, 43, 46, 51 a

pressed. All languages do this more or less, but [b]especially,[b] among modern European languages, the German; while even that is inferior to the Greek, in which the relation between the meaning of a derivative word and that of its primitive is in general clearly marked by its mode of formation; except in the case of words compounded with prepositions, which [c] are often [d], in both those languages,[d] extremely anomalous.

But all that can be done, by the mode of constructing words, to prevent them from degenerating into sounds passing through the mind without any distinct apprehension of what they signify, is far too little for the necessity of the case. Words, however well constructed originally, are always tending, like coins, to have their inscription worn off by passing from hand to hand; and the only possible mode of reviving it is to be ever stamping it afresh, by living in the habitual contemplation of the phenomena themselves, and not resting in our familiarity with the words that express them. If any one, having possessed himself of the laws of phenomena as recorded in words, whether delivered to him originally by others, or even found out by himself, is content from thenceforth to live [e]among[e] these formulæ, to think exclusively of them, and of applying them to cases as they arise, without keeping up his acquaintance with the realities from which these laws were collected—not only will he continually fail in his practical efforts, because he will apply his formulæ without duly considering whether, in this case and in that, other laws of nature do not modify or supersede them; but the formulæ themselves will progressively lose their meaning to him, and he will cease at last even to be capable of recognising with certainty whether a case falls within the contemplation of his formula or not. It is, in short, as necessary, on all subjects not mathematical, that the things on which we reason should be conceived by us in the concrete, and "clothed in circumstances," as it is in [f]algebra[f] that we should keep all individualizing peculiarities sedulously out of view.

With this remark we [g] close our [h] observations on the Philosophy of Language.

[b-b]MS most
[c]MS, 43, 46, 51 , it must be acknowledged,
[d-d]+43, 46, 51, 56, 62, 65, 68, 72
[e-e]MS, 43 in the midst of
[f-f]MS mathematics
[g]MS, 43, 46, 51, 56 shall
[h]MS present

CHAPTER VII

Of Classification, as Subsidiary to Induction

§ 1. [*Classification as here treated of, wherein different from the classification implied in naming*] There is, as [a]has been[a] frequently remarked in this work, a classification of things, which is inseparable from the fact of giving them general names. Every name which connotes an attribute, divides, by that very fact, all things whatever into two classes, those which have the attribute and those which have [b]it[b] not; those of which the name can be predicated, and those of which it cannot. And the division thus made is not merely a division of such things as actually exist, or are known to exist, but of all such as may hereafter be discovered, and even of all [c]which[c] can be imagined.

On this kind of Classification we have nothing to add to what has previously been said. The Classification which requires to be discussed as a separate act of the mind, is altogether different. In the one, the arrangement of objects in groups, and distribution of them into compartments, is a mere incidental effect consequent on the use of names given for another purpose, namely that of simply expressing some of their qualities. In the other, the arrangement and distribution [d]are[d] the main object, and the naming is secondary to, and purposely conforms itself to, instead of governing, that more important operation.

Classification, thus regarded, is a contrivance for the best possible ordering of the ideas of objects in our minds; for causing [e]the[e] ideas to accompany or succeed one another in such a way as shall give us the greatest command over our knowledge already acquired, and lead most directly to the acquisition of more. The general problem of Classification, in reference to these purposes, may be stated as follows: To provide that things shall be thought of in such groups, and those groups in such an order, as will [f]best[f] conduce to the remembrance and to the ascertainment of their laws.

[a-a]MS, 43, 46 we have
[b-b]+62, 65, 68, 72
[c-c]MS, 43, 46, 51, 56 such as
[d-d]MS is
[e-e]MS those
[f-f]MS most

Classification thus considered, differs from classification in the wider sense, in having reference to real objects exclusively, and not to all that are imaginable: its object being the due co-ordination in our minds of those things only, with the properties of which we have actually occasion to make ourselves acquainted. But, on the other hand, it embraces *all* really existing objects. We cannot constitute any one class properly, except in reference to a general division of the whole of nature; we cannot determine the group in which any one object can most conveniently be placed, without taking into consideration all the [g] varieties of existing objects, all at least which have any degree of affinity with it. No one family of plants or animals could have been rationally constituted, except as part of a systematic arrangement of all plants or animals; nor could such a general arrangement have been properly made, without first determining the exact place of plants and animals in a general division of nature. [h]

§ 2. [*Theory of natural groups*] There is no property of objects which may not be taken, if we please, as the foundation for a classification or mental grouping of those objects; and in our first attempts we are likely to select for that purpose properties which are simple, easily conceived, and perceptible on a first view, without any previous process of thought. Thus Tournefort's arrangement of plants was founded on the shape and divisions of the corolla; and that which is commonly called the Linnæan (though Linnæus [a]also suggested another and[a] more scientific arrangement) was grounded chiefly on the number of the stamens and pistils.

But these classifications, which are at first recommended by the facility they afford of ascertaining to [b]what[b] class any individual belongs, are seldom much adapted to the ends of that Classification which is the subject of our present remarks. The Linnæan arrangement answers the purpose of making us think together of all those kinds of plants which possess the same number of stamens and pistils; but to think of them in that manner is of little use, since we seldom have anything to affirm in common of the plants which have a given number of stamens and pistils. If plants of the class Pentandria, order

[g]MS other

[h]MS [*paragraph*] The theory of scientific classification, in its most general aspect, is now very well understood, owing chiefly to the labours of the distinguished naturalists to whom science is indebted for what are called Natural Arrangements or Classifications, especially of the organized world. Mr. Whewell, in his *Philosophy of the Inductive Sciences*, has systematized a portion of the general logical principles which those classifications exemplify; but this has been still more completely done by M. Comte, whose view of the philosophy of classification, in the third volume of his great work, is the most complete with which I am acquainted. [See, e.g., *Cours*, Vol. III, pp. 445ff., 537ff.]] 43, 46 *as* MS . . . which these classifications exemplify; and this . . . *as* MS

[a-a]MS was also the author of another & a

[b-b]MS which

Monogynia, agreed in any other properties, the habit of thinking and speaking of the plants under a common designation would conduce to our remembering those common properties so far as they were ascertained, and would dispose us to be on the look-out for such of them as [c]were[c] not yet known. But since this is not the case, the only purpose of thought which the Linnæan classification serves is that of causing us to remember, better than we should otherwise have done, the exact number of stamens and pistils of every species of plants. Now, as this property is of little importance or interest, the remembering it with any particular accuracy is of no moment. And, inasmuch as, by habitually thinking of plants in those groups, we are prevented from habitually thinking of them in groups which have a greater number of properties in common, the effect of such a classification, when systematically adhered to, upon our habits of thought, must be regarded as mischievous.

The ends of scientific classification are best answered, when the objects are formed into groups respecting which a greater number of general propositions can be made, and those propositions more important, than could be made respecting any other groups into which the same things could be distributed. The properties, therefore, according to which objects are classified, should, if possible, be those which are causes of many other properties: or at any rate, which are sure marks of them. Causes are preferable, both as being the surest and most direct of marks, and as being themselves the properties on which it is of most use that our attention should be strongly fixed. But the property which is the cause of the chief peculiarities of a class, is [d]unfortunately[d] seldom fitted to serve also as the diagnostic of the class. Instead of the cause, we must generally select some of its more prominent effects, which may serve as marks of the other effects and of the cause [e] .

A classification thus formed is properly scientific or philosophical, and is commonly called a Natural, in contradistinction to a Technical or Artificial, classification or arrangement. The phrase Natural Classification seems most peculiarly appropriate to such arrangements as correspond, in the groups which they form, to the spontaneous tendencies of the mind, by placing together the objects most similar in their general aspect: in opposition to those technical systems which, arranging things according to their agreement in some circumstance arbitrarily selected, often throw into the same group objects which in the general aggregate of their properties present no resemblance, and into different and remote groups, others which have the closest similarity. It is one of the most valid recommendations of any classification to the character of a scientific one, that it shall be a natural classification in this sense also; for the test of its scientific character is the number and importance of the properties which can be asserted in common of all objects

[c-c]MS, 43 are
[d-d]+43, 46, 51, 56, 62, 65, 68, 72
[e]MS, 43, 46, 51 itself

included in a group; and properties on which the general aspect of the things depends, are [f], if only on that ground, important[f], as well as, in most cases, numerous. But, though a strong recommendation, this circumstance is not a *sine quâ non*; [g]since the most[g] obvious properties of things may be of trifling importance compared with others that are not obvious. I have seen it mentioned as a great absurdity in the Linnæan classification, that it places (which by the way it does not) the violet by the side of the oak: it certainly dissevers natural affinities, and brings together things quite as unlike as the oak and the violet are. But the difference, apparently so wide, which renders the juxtaposition of [h]those[h] two vegetables so suitable an illustration of a bad arrangement, depends, to the common eye, mainly on mere size and texture; now if we made it our study to adopt the classification which would involve the least peril of similar *rapprochements*, we should return to the obsolete division into trees, shrubs, and herbs, which though of primary importance with regard to mere general aspect, yet (compared even with so petty and unobvious a distinction as that into dicotyledons and monocotyledons) answers to so few differences in the other properties of plants, that a classification founded on it (independently of the indistinctness of the lines of demarcation) would be as completely artificial and technical as the Linnæan.

Our natural groups, therefore, must often be founded not on the obvious, but on the unobvious properties of things, when these are of greater importance. But in such cases it is essential that there should be some other property or set of properties, more readily recognisable by the observer, which coexist with, and may be received as marks of, the properties which are the real groundwork of the classification. A natural arrangement, for example, of animals, must be founded in the main on their internal structure, but (as [i]M. Comte remarks[i])[*] it would be absurd that we should not be able to determine the genus and species of an animal without first killing it. On this ground, [j]the preference, among zoological classifications, is probably due[j] to that of M. de Blainville, founded on the differences in the external integuments; differences which correspond, much more accurately than might be supposed, to the really important varieties, both in the other parts of the structure, and in the habits and history of the animals.

This shows, more strongly than ever, how extensive a knowledge of the properties of objects is necessary for making a good classification of them.

[*Cours, Vol. III, p. 579.]

[f-f]MS important, if only on that ground
[g-g]MS for the] 43, 46 since the more
[h-h]MS these
[i-i]MS, 43 M. Comte justly remarks] 46, 51, 56, 62, 65, 68 has been justly remarked
[j-j]MS, 43 M. Comte gives the preference, among zoological classifications, [*Cours*, Vol. III, p. 580]

And as it is one of the uses of such a classification that by drawing attention to the properties on which it is founded, and which if the classification be good are marks of many others, it facilitates the discovery of those others; we see in what manner our knowledge of things, and our classification of them, tend mutually and indefinitely to the improvement of [k]each other[k].

We said just now that the classification of objects should follow those of their properties which indicate not only the most numerous, but also the most important peculiarities. What is here meant by importance? It has reference to the particular end in view; and the same objects, therefore, may admit with propriety of several different classifications. Each science or art forms its classification of things according to the properties which fall within its special cognizance, or of which it must take account in order to accomplish its peculiar practical [l]end[l]. A farmer does not divide plants, like a botanist, into dicotyledonous and monocotyledonous, but into useful plants and weeds. A geologist divides fossils, not like a zoologist, into families corresponding to those of living species, but into fossils of the [m]palæozoic, mesozoic, and[m] tertiary periods, above the coal and below the coal, &c. Whales are or are not fish, according to the purpose for which we are considering them.

If we are speaking of the internal structure and physiology of the animal, we must not call them fish; for in these respects they deviate widely from fishes: they have warm blood, and produce and suckle their young as land quadrupeds do. But this would not prevent our speaking of the *whale fishery*, and calling such animals *fish* on all occasions connected with this employment; for the relations thus arising depend upon the animal's living in the water, and being caught in a manner similar to other fishes. A plea that human laws which mention fish do not apply to whales, would be rejected at once by an intelligent judge.*

These different classifications are all good, for the purposes of their own particular departments of knowledge or practice. But when we are studying objects not for any special practical end, but for the sake of extending our knowledge of the whole of their properties and relations, we must consider as the most important attributes, those which contribute most, either by themselves or by their effects, to render the things like one another, and unlike other things; which give to the class composed of them the most marked individuality; which fill, as it were, the largest space in their existence, and would most [n]impress[n] the attention of a spectator who knew all their properties but was not specially interested in any. Classes formed on this principle may be called, in a more emphatic manner than any others, natural groups.

**Novum Organon Renovatum*, pp. 286–7.

[k-k]MS, 43 one another [l-l]MS, 43, 46, 51, 56 ends
[m-m]MS, 43, 46, 51, 56, 62, 65, 68 secondary and of the
[n-n]MS engross [*printer's error?*]

§ 3. [*Are natural groups given by type, or by definition?*] On the subject of these groups Dr. Whewell lays down a theory, grounded on an important truth, which he has, in some respects, expressed and illustrated very felicitously, but also, as it appears to me, with some admixture of error. It will be advantageous, for both these reasons, to extract the statement of his doctrine in the very words he has used.

"Natural groups," according to [a]this theory[a],* are "given by Type, not by Definition." And this consideration accounts for [b]that

indefiniteness[b] and indecision which we frequently find in the descriptions of such groups, and which must appear so strange and inconsistent to any one who does not suppose these descriptions to assume any deeper ground of connexion than an arbitrary choice of the botanist. Thus in the family of the rose-tree, we are told that the *ovules* are *very rarely* erect, the *stigmata usually* simple. Of what use, it might be asked, can such loose accounts be? To which the answer is, that they are not inserted in order to distinguish the species, but in order to describe the family, and the total relations of the ovules and the stigmata of the family are better known by this general statement. A similar observation may be made with regard to the Anomalies of each group, which occur so commonly, that [c]Dr.[c] Lindley, in his *Introduction to the Natural System of Botany*,[*] makes the 'Anomalies' an article in each family. Thus, part of the character of the Rosaceæ is, that they have alternate *stipulate* leaves, and that the *albumen* is *obliterated*; but yet in *Lowea*, one of the genera of this family, the stipulæ are *absent*; and the albumen is *present* in another, *Neillia*. This implies, as we have already seen, that the artificial character (or *diagnosis*, as Mr. Lindley calls it,) is imperfect. It is, though very nearly, yet not exactly, commensurate with the natural group: and hence in certain cases this character is made to yield to the general weight of natural affinities.

These views,—of classes determined by characters which cannot be expressed in words,—of propositions which state, not what happens in all cases, but only usually,—of particulars which are included in a class, though they transgress the definition of it, may [d] probably surprise the reader. They are so contrary to many of the received opinions respecting the use of definitions, and the nature of scientific propositions, that they will probably appear to many persons highly illogical and unphilosophical. But a disposition to such a judgment arises in a great measure from this, that the mathematical and mathematico-physical sciences have, in a great degree, determined men's views of the general nature and form of scientific truth; while Natural History has not yet had time or opportunity to exert its due influence upon the current habits of philosophizing. The apparent indefiniteness and inconsistency of the classifications and definitions of Natural History belongs, in a far higher degree, to all other except mathematical speculations; and the modes in which approximations to exact distinctions and general

**History of Scientific Ideas*, Vol. II, pp. 120–2.
[*London: Longman, 1830, p. 81.]

[a-a]MS, 43 Mr. Whewell
[b-b]MS, 43, 46, 51, 56 "that indefiniteness
[c-c]Source, MS, 43, 46, 51, 56, 62, 65, 68 Mr.
[d]Source, MS very

truths have been made in Natural History, may be worthy our attention, even for the light they throw upon the best modes of pursuing truth of all kinds.

Though in a Natural group of objects a definition can no longer be of any use as a regulative principle, classes are not therefore left quite loose, without any certain standard or guide. The class is steadily fixed, though not precisely limited; it is given, though not circumscribed; it is determined, not by a boundary line without, but by a central point within; not by what it strictly excludes, but by what it eminently includes; by an example, not by a precept; in short, instead of a Definition we have a Type for our director.

A Type is an example of any class, for instance a species of a genus, which is considered as eminently possessing the characters of the class. All the species which have a greater affinity with this type-species than with any others, form the genus, and are ranged about it, deviating from it in various directions and different degrees. Thus a genus may consist of several species which approach very near the type, and of which the claim to a place with it is obvious; while there may be other species which straggle further from this central knot, and which yet are clearly more connected with it than with any other. And even if there should be some species of which the place is dubious, and which appear to be equally bound to two generic types, it is easily seen that this would not destroy the reality of the generic groups, any more than the scattered trees of the intervening plain prevent our speaking intelligibly of the distinct forests of two separate hills.

The type-species of every genus, the type-genus of every family, is, then, one which possesses all the characters and properties of the genus in a marked and prominent manner. The type of the Rose family has alternate stipulate leaves, wants the albumen, has the ovules not erect, has the stigmata simple, and besides these features, which distinguish it from the exceptions or varieties of its class, it has the features which make it prominent in its class. It is one of those which possess clearly several leading attributes; and thus, though we cannot say of any one genus that it *must* be the type of the family, or of any one species that it *must* be the type of the genus, we are still not wholly to seek; the type must be connected by many affinities with most of the others of its group; it must be near the centre of the crowd, and not one of the stragglers.

In this passage (the latter part of which especially I cannot help noticing as an admirable example of philosophic style) Dr. Whewell has stated very clearly and forcibly, but (I think) without making all necessary distinctions, one of the principles of a Natural Classification. What this principle is, what are its limits, and in what manner [e]he[e] seems to me to have overstepped them, will appear when we have laid down another [f]rule of Natural Arrangement, which appears to me still more fundamental[f].

§ 4. [*Kinds are natural groups*] The reader is by this time familiar with the general truth (which I restate so often on account of the great confusion in which it is commonly involved), that there are in nature distinctions of Kind; distinctions not consisting in a given number of definite properties,

[e-e]MS, 43 Mr. Whewell

[f-f]MS, 43 and more fundamental rule of Natural Arrangement, entitled to precedency over that which Mr. Whewell has here in view

plus the effects which follow from those properties, but running through the whole nature, through the attributes generally, of the things so distinguished. Our knowledge of the properties of a Kind is never complete. We are always discovering, and expecting to discover, new ones. Where the distinction between [a]two classes of[a] things is not one of Kind, we expect to find their properties alike, except where there is some reason for their being different. On the contrary, [b]when[b] the distinction is in Kind, we expect to find the properties different unless there be some cause for their being the same. All knowledge of a Kind must be obtained by observation and experiment upon the Kind itself; no inference respecting its properties from the properties of things not connected with it by Kind, goes for more than the sort of presumption usually characterized as an analogy, and generally in one of its fainter degrees.

Since the common properties of a true Kind, [c]and consequently[c] the general assertions which can be made respecting it, or which are certain to be made hereafter as our knowledge extends, are indefinite and inexhaustible; [d]and since[d] the very first principle of natural classification [e]is that of forming the classes so that the objects composing each may have the greatest number of properties in common; this principle[e] prescribes that every such classification shall recognise and adopt into itself all distinctions of Kind, which exist among the objects it professes to classify. To pass over any distinctions of Kind, and substitute definite distinctions, which, however considerable they may be, do not point to ulterior unknown differences, would be to replace classes with more by classes with fewer attributes in common [f]; and[f] would be subversive of the Natural Method of Classification.

Accordingly all natural arrangements, whether the reality of the distinction of Kinds was felt or not by their framers, have been led, by the mere pursuit of their own proper end, to conform themselves to the distinctions of Kind, so far as these had been ascertained at the time. The Species of Plants are not only real Kinds, but are probably, [g] all of them, real lowest Kinds, [h] Infimæ Species; which, if we were to subdivide, as of course it is open to us

[a–a]+62, 65, 68, 72
[b–b]MS where [*printer's error?*]
[c–c]+43, 46, 51, 56, 62, 65, 68, 72
[d–d]+43, 46, 51, 56, 62, 65, 68, 72
[e–e]MS (that of forming . . . common,)
[f–f]MS , which
[g]MS, 43, 46, 51, 56, 62, 65, 68 [*footnote:*] *I say probably, not certainly, because this is not the consideration by which a botanist determines what shall or shall not be admitted as a species. In natural history those objects belong to the same species, which are, or consistently with experience might have been, produced from the same stock. But this distinction, in most, and probably in all cases, happily accords with the other. It seems to be a law of physiology, that animals and plants do really, in the philosophical as well as the popular sense, propagate their kind; transmitting to their descendants all the distinctions of Kind (down to the most special or lowest Kind) which they themselves possess.
[h]MS, 43 or

to do, into sub-classes, the subdivision would necessarily be founded on *definite* distinctions, not pointing (apart from what may be known of their causes or effects) to any difference beyond themselves.

In so far as a natural classification is grounded on real Kinds, its groups are certainly not conventional; [i]it is perfectly true[i] that they do not depend upon an arbitrary choice of the naturalist. But it does not follow, nor, I conceive, is it true, that these classes are determined by a type, and not by characters. To determine them by a type would be as sure a way of missing the Kind, as if we were to select a set of characters arbitrarily. They are determined by characters, but [j]these[j] are not arbitrary. The problem is, to find a few definite characters which point to the multitude of indefinite ones. Kinds are Classes between which there is an impassable barrier; and what we have to seek is, marks [k]whereby[k] we may determine on which side of the barrier an object takes its place. The characters which will best do this [l] should be chosen: if they are also important in themselves, so much the better. When we have selected the characters, we parcel out the objects according to those characters, and not, [m]I conceive[m], according to resemblance to a type. We do not compose the species Ranunculus acris, of all plants which bear a satisfactory degree of resemblance to a model-buttercup, but of those which possess certain characters selected as marks by which we might recognise the possibility of a common parentage; and the enumeration of [n]those[n] characters is the definition of the species.

The question next arises, whether, as all Kinds must have a place among the classes, so all the classes in a natural arrangement must be Kinds? And to this I answer, certainly not. The distinctions of [o]Kinds[o] are not numerous enough to [p]make up the whole[p] of a classification. Very few of the genera of plants, or even of the families, can be pronounced with certainty to be Kinds. The great distinctions of Vascular and Cellular, Dicotyledonous or Exogenous and Monocotyledonous or Endogenous [q]plants[q], are perhaps differences of Kind; the lines of demarcation which divide those classes seem (though even on this I would not pronounce positively) to go through the whole nature of the plants. But the different species of a genus, or genera of a family, usually have in common only a limited number of characters. A [r]Rose[r] does not seem to differ from a Rubus, or the Umbelliferæ from the Ranunculaceæ, in much else than the characters botanically assigned to those

[i-i]MS, 43 Mr. Whewell is quite right in affirming
[j-j]MS, 43 which
[k-k]MS by which
[l]MS, 43, 46 are what
[m-m]MS, 43 as Mr. Whewell seems to suppose
[n-n]MS which
[o-o]MS, 43, 46, 51, 56 Kind
[p-p]MS, 43 supply the whole basis
[q-q]+62, 65, 68, 72
[r-r]MS, 43, 46, 51, 56 Rosa

genera or those families. Unenumerated differences certainly do exist in some cases; there are families of plants which have peculiarities of chemical composition, or yield products having peculiar effects on the animal economy. The Cruciferæ and Fungi contain an unusual proportion of [s]nitrogen[s]; the Labiatæ are the chief sources of essential oils, the Solaneæ are very commonly narcotic, &c. In these and similar cases there are possibly distinctions of Kind; but it is by no means indispensable that there should be. Genera and Families may be eminently natural, though marked out from one another by properties limited in number; [t]provided[t] those properties [u]are[u] important, and the objects contained in each genus or family resemble each other more than they resemble anything which is excluded from the genus or family.

After the recognition and definition, then, of the *infimæ species*, the next step is to arrange [v]those *infimæ species* into larger groups: making these[v] groups correspond to Kinds wherever it is possible, but in most cases without any such guidance. And in doing this it is true that we are naturally and properly guided, in most cases at least, by resemblance to a type. We form our groups round certain selected Kinds, each of which serves as a sort of exemplar of its group. But though the groups are suggested by types, I cannot [w]think[w] that a group when formed is *determined* by the type; that in deciding whether a species belongs to the group, a reference is made to the type, and not to the characters; that the characters "cannot be expressed in words."[*] This assertion is inconsistent with Dr. Whewell's own statement of the fundamental [x]principle[x] of classification, namely, that "general assertions shall be possible."[†] If the class did not possess any characters in common, what general assertions would be possible respecting it? Except that they all resemble each other more than they resemble anything else, nothing whatever could be predicated of the class.

The truth is, on the contrary, that every genus or family is framed with distinct reference to certain characters, and is composed, first and principally, of species which agree in possessing all those characters. To these are added, as a sort of appendix, such other species, generally in small number, as possess *nearly* all the properties selected; wanting some of them one property, some another, and which, while they agree with the rest *almost* as much as these agree with one another, do not resemble in an equal degree any other group. Our conception of the class continues to be grounded on the characters; and the class might be defined, those things which *either* possess that

[**History of Scientific Ideas*, Vol. II, p. 121.]
[†*Ibid*., p. 100.]

[s-s]MS, 43, 46, 51, 56 azote [t-t]MS so
[u-u]MS, 43, 46, 51, 56 be
[v-v]MS, 43, 46 these *infimæ* . . . making those
[w-w]MS, 43 agree with Mr. Whewell [x-x]51 principles [*printer's error?*]

set of characters, *or* resemble the things that do so, more than they resemble anything else.

And this resemblance itself is not, like resemblance between simple sensations, an ultimate fact, unsusceptible of analysis. Even the inferior degree of resemblance is created by the possession of common characters. Whatever resembles the genus Rose more than it resembles any other genus, does so because it possesses a greater number of the characters of that genus, than of the characters of any other genus. Nor can there be [y]any real[y] difficulty in representing, by an enumeration of characters, the nature and degree of the resemblance which is strictly sufficient to include any object in the class. There are always some properties common to all things which are included. Others there often are, to which some things, which are nevertheless included, are exceptions. But the objects which are exceptions to one character are not exceptions to another: the resemblance which fails in some particulars must be made up for in others. The class, therefore, is constituted by the possession of *all* the characters which are universal, and *most* of those which admit of exceptions. If a plant had the ovules erect, the stigmata divided, [z]possessed the albumen[z], and was without stipules, it [a]possibly[a] would not be classed among the Rosaceæ. But it may want any one, or [b] more than one of these characters, and not be excluded. The ends of a scientific classification are better answered by including it. Since it agrees so nearly, in its known properties, with the sum of the characters of the class, it is likely to resemble that class more than any other in those [c]of its properties[c] which are still undiscovered.

Not only, therefore, are natural groups, no less than any artificial classes, determined by characters; they are constituted in contemplation of, and by reason of, characters. But it is in contemplation not of those characters only which are rigorously common to all the objects included in the group, but of the entire body of characters, all of which are found in most of those objects, and most of them in all. And hence our conception of the class, the image in our minds which is representative of it, is that of a specimen complete in all the characters; most naturally a specimen which, by possessing them all in the greatest degree in which they are ever found, is the best fitted to exhibit clearly, and in a marked manner, what they are. It is by a mental reference to this standard, not instead of, but in illustration of, the definition of the class, that we usually and advantageously determine whether any individual or species belongs to the class or not. And this, as it seems to me, is the amount of [d]truth contained in the[d] doctrine of Types.

[y–y]MS, 43, 46, 51, 56, 62, 65 the smallest
[z–z]MS, 43, 46, 51 the albumen not obliterated
[a–a]MS, 43, 46, 51, 56, 62, 65 probably
[b]MS perhaps [c–c]+43, 46, 51, 56, 62, 65, 68, 72
[d–d]MS the truth which is contained in Mr. Whewell's] 43 truth . . . *as* MS

We shall see presently that where the classification is made for the express purpose of a special inductive inquiry, it is not optional, but necessary for fulfilling the conditions of a correct Inductive Method, that we should establish a type-species or genus, namely, the one which exhibits in the most eminent degree the particular phenomenon under investigation. But of this hereafter. It remains, for completing the theory of natural groups, that a few words should be said on the principles of the nomenclature adapted to them.

§ 5. [*How the names of Kinds should be constructed*] A Nomenclature [a]in science, is, as we have said,[a] a system of the names of Kinds. These names, like other class-names, are defined by the enumeration of the characters distinctive of the class. The only merit which a set of names can have beyond this, is to convey, by the mode of their construction, as much information as possible: so that a person who knows the thing, may receive all the assistance which the name can give in remembering what he knows, while he who knows it not, may receive as much knowledge respecting it as the case admits of, by merely being told its name.

There are two modes of giving to the name of a Kind this sort of significance. The best, but which unfortunately is seldom practicable, is when the word can be made to indicate, by its formation, the very properties which it is designed to connote. The name of a Kind does not, of course, connote all the properties of the Kind, since these are inexhaustible, but such of them as are sufficient to distinguish it; such as are sure marks of all the rest. Now, it is very [b]rarely[b] that one property, or even any two or three properties, can answer this purpose. To distinguish the common daisy from all other species of plants would require the specification of many characters. And a name cannot, without being too cumbrous for use, give indication, by its etymology or mode of construction, of more than a very small number of these. The possibility, therefore, of an ideally perfect Nomenclature, is probably confined to the one case in which we are happily in possession of something [c] approaching to it; [d] the Nomenclature of [e]elementary[e] Chemistry. The substances, whether simple or compound, with which chemistry is conversant, are Kinds, and, as such, the properties which distinguish each of them from the rest are innumerable; but in the case of compound substances (the simple ones are not numerous enough to require a systematic nomenclature), there is one property, the chemical composition, which is of itself sufficient to distinguish the Kind; [f]and is (with certain reservations not yet thoroughly understood)[f] a sure mark of all the other properties [g]of the compound[g]. All

[a-a]MS, 43, 46 , as we have said, is
[b-b]MS, 43 rare
[c]MS, 43, 46, 51, 56, 62, 65, 68 nearly
[d]MS, 43 I refer to
[e-e]+46, 51, 56, 62, 65, 68, 72
[f-f]MS, 43, 46 of itself
[g-g]MS belonging to it

that was needful, therefore, was to make the name of every compound express, on the first hearing, its chemical composition; that is, to form the name of the compound, in some uniform manner, from the names of the simple substances which enter into it as elements. This was done, most skilfully and successfully, by the French chemists [h], though their nomenclature has become inadequate to the convenient expression of the very complicated compounds now known to chemists[h]. The only thing left unexpressed by them was the exact proportion in which the elements were combined; and even this, since the establishment of the atomic theory, it has been found possible to express by a simple adaptation of their phraseology.

But where the characters which must be taken into consideration, in order sufficiently to designate the Kind, are too numerous to be all signified in the derivation of the name, and where no one of them is of such preponderant importance as to justify its being singled out to be so indicated, we may avail ourselves of a subsidiary resource. Though we cannot indicate the distinctive properties of the Kind, we may indicate its nearest natural affinities, by incorporating into its name the name of the proximate natural group of which it is one of the species. On this principle is founded the admirable binary nomenclature of botany and zoology. In this nomenclature the name of every species consists of the name of the genus, or natural group next above it, with a word added to distinguish the particular species. [i]The[i] last portion of the compound name is sometimes taken from some *one* of the peculiarities in which that species differs from others of the genus; as Clematis *integrifolia*, Potentilla *alba*, Viola *palustris*, Artemisia *vulgaris*; sometimes from a circumstance of an historical nature, as Narcissus *poeticus*, Potentilla *tormentilla* (indicating that the plant [j]is that which[j] was formerly known by the latter name), Exacum *Candollii* (from the fact that De Candolle was its first discoverer); and sometimes the word is purely conventional, as Thlaspi *bursa-pastoris*, Ranunculus *thora*; it is of little consequence which; since the second, or as it is usually called, the specific name, could at most express, independently of convention, no more than a very small portion of the connotation of the term. But by adding to this the name of the superior genus, we [k]may[k] make the best amends we can for the impossibility of so contriving the name as to express all the distinctive characters of the Kind. We make it, at all events, express as many of those characters as are common to the proximate natural group in which the Kind is included. If even those common characters are so numerous or so little familiar as to require a further extension of the same resource, we might, instead of a binary, adopt a ternary nomenclature, employing not only the name of the genus, but that of the next natural group in order of generality above the genus, commonly

[h-h]+72
[i-i]MS, 43, 46, 51 This
[j-j]+72
[k-k]+56, 62, 65, 68, 72

called the Family. This [l]was[l] done in the mineralogical nomenclature proposed by Professor Mohs. "The names framed by him [m] were not composed of two, but of three elements, designating respectively the Species, the Genus, and the Order; thus he has such species as *Rhombohedral Lime Haloide, Octohedral Fluor Haloide, Prismatic Hal Baryte.*"* The binary construction, however, has been found sufficient in botany and zoology, the only sciences in which this general principle has hitherto been successfully adopted in the construction of a nomenclature.

Besides the advantage which this principle of nomenclature possesses, in giving to the names of species the greatest quantity of independent significance which the circumstances of the case admit of, it answers the further end of immensely economizing the use of names, and preventing an otherwise intolerable burden on the memory. When the names of species become extremely numerous, some artifice (as Dr. Whewell† observes) becomes absolutely necessary to make it possible to recollect or apply them.

The known species of plants, for example, were ten thousand in the time of Linnæus, and are now probably sixty thousand. It would be useless to endeavour to frame and employ separate names for each of these species. The division of the objects into a subordinated system of classification enables us to introduce a Nomenclature which does not require this enormous number of names. Each of the genera has its name, and the species are marked by the addition of some epithet to the name of the genus. In this manner about seventeen hundred generic names, with a moderate number of specific names, were found ~~by~~ Linnæus sufficient to designate with precision all the species of vegetables known at his time.

And though the number of generic names has since greatly increased, it has not increased in anything like the proportion of the multiplication of known species.

*[46] *Novum Organon Renovatum*, pp. 274–5. [cf. [m] below.]
†*History of Scientific Ideas*, Vol. II, p. 133.

[l-l]MS is
[m]MS, 43 ," says Mr. Whewell*, " [*footnote reference is equivalent to that given in footnote* above*]*

CHAPTER VIII

Of Classification by Series

§ 1. [*Natural groups should be arranged in a natural series*] Thus far, we have considered the principles of scientific classification so far only as relates to the formation of natural groups; and at this point most of those who have attempted a theory of natural arrangement, including, among the rest, Dr. Whewell, have stopped. There remains, however, another, and a not less important portion of the theory, which has not yet, [a]as[a] far as I am aware, been systematically treated of by any writer except M. Comte.[*] This is, the arrangement of the natural groups into a natural series.*

The end of Classification, as an instrument for the investigation of nature, is (as before stated) to make us think of those objects together, which have the greatest number of important common properties; and which, therefore, we have oftenest occasion, in the course of our inductions, for taking into joint consideration. Our ideas of objects are thus brought into the order most conducive to the successful prosecution of inductive inquiries generally. But when the purpose is to facilitate some particular inductive inquiry, more is required. To be instrumental to that purpose, the classification must bring those objects together, the simultaneous contemplation of which is likely to throw most light upon the particular subject. That subject being the laws of some phenomenon or some set of connected phenomena; the very pheno-

[*See *Cours*, Vol. III, Leçon 42.]

*[51] Dr. Whewell, in his reply (*Philosophy of Discovery*, p. 270) says that he "stopped short of, or rather passed by, the doctrine of a series of organized beings," because he "thought it bad and narrow philosophy." If he did, [b]it was evidently without understanding this form of the doctrine;[b] for he proceeds to quote a passage from his *History*, [1st ed., Vol. III, pp. 353–4,] in which the doctrine he condemns is designated as that of "a mere linear progression in nature, which would place each genus in contact only with the preceding and succeeding ones." Now the series treated of in the text agrees with this linear progression in nothing whatever but in being a progression.

It would surely be possible to arrange all *places* (for example) in the order of their distance from the North Pole, though there would be not merely a plurality, but a whole circle of places at every single gradation in the scale.

[a-a]MS, 43, 46, 51 so
[b-b]51, 56 I am afraid it was without understanding it:

menon or set of phenomena in question must be chosen as the groundwork of the classification.

The requisites of a classification intended to facilitate the study of a particular phenomenon, are, first, to bring into one class all Kinds of things which exhibit that phenomenon, in whatever variety of forms or degrees; and secondly, to arrange [c]those[c] Kinds in a series according to the degree in which they exhibit it, beginning with those which exhibit most of it, and terminating with those which exhibit least. The principal example, as yet, of such a classification, is afforded by comparative anatomy and physiology, from which, therefore, our illustrations shall be taken.

§ 2. [*The arrangement of the natural series should follow the degrees of the main phenomenon*] The object being supposed to be, the investigation of the laws of animal life; the first step, after [a]forming[a] [b]the most distinct conception of the phenomenon itself, possible in the existing state of our knowledge,[b] is to erect into one great class (that of animals) all the [c]known Kinds of beings[c] where that phenomenon presents itself; in however various combinations with other properties, and in however different degrees. As some of these Kinds manifest the [d]general[d] phenomenon of animal life in a very high degree, and others in an insignificant degree, barely sufficient for recognition; we must, in the next place, arrange the various Kinds in a series, following one another according to the degrees in which they severally exhibit the phenomenon; beginning therefore with man, and ending with the most imperfect kinds of zoophytes.

This is merely saying that we should put the instances, from which the law is to be inductively collected, into the order which is implied in one of the four Methods of Experimental Inquiry discussed in the preceding Book; the fourth Method, that of Concomitant Variations. As [e] formerly remarked, this is often the only method to which recourse can be had, with assurance of a true conclusion, in cases in which we have but limited means of effecting, by artificial [f]experiments[f], a separation of circumstances usually conjoined. The principle of the method is, that facts which increase or diminish together, and disappear together, are either cause and effect, or effects of a common cause. When it has been ascertained that this relation really subsists between the variations, a connexion between the facts themselves may be confidently laid down, either as a law of nature or only as an empirical law, according to circumstances.

[c-c]MS these [*printer's error?*]
[a-a]MS framing [*printer's error?*]
[b-b]MS, 43, 46, 51, 56 a distinct conception of the phenomenon itself,
[c-c]MS different Kinds of beings (omitting no Kind that is known to exist)
[d-d]+43, 46, 51, 56, 62, 65, 68, 72
[e]MS, 43, 46 we
[f-f]MS experiment

That the application of this Method must be preceded by the formation of such a series as we have described, is too obvious to need being pointed out; and the mere arrangement of a set of objects in a series, according to the degrees in which they exhibit some fact of which we are seeking the law, is too naturally suggested by the necessities of our inductive operations, to require any lengthened illustration here. But there are cases in which the arrangement required for the special purpose, becomes the determining principle of the classification of the same objects for general purposes. This will naturally and properly happen, when those laws of the objects which are sought in the special inquiry enact so principal a part in the general character and history of those objects—exercise so much influence in determining all the phenomena of which they are either the agents or the theatre—that all other differences existing among the objects are fittingly regarded as mere modifications of the one phenomenon sought; effects determined by the co-operation of some incidental circumstance with the laws of that phenomenon. Thus in the case of animated beings, the differences between one class of animals and another may reasonably be considered as mere modifications of the general phenomenon, animal life; modifications arising either from the different degrees in which that phenomenon is manifested in different animals, or from the intermixture of the effects of incidental causes peculiar to the nature of each, with the effects produced by the general laws of life; those laws still exercising a predominant influence over the result. Such being the case, no other inductive inquiry respecting animals can be successfully carried on, except in subordination to the great inquiry into the universal laws of animal life; and the classification of animals best suited to that one purpose, is the most suitable to all the other purposes of zoological science.

§ 3. [*Following the degrees of the main phenomenon implies the assumption of a type species*] To establish a classification of this sort, or even to [a]apprehend[a] it when established, requires the power of recognising the essential similarity of a phenomenon, in its minuter degrees and obscurer forms, with what is called the *same* phenomenon in the greatest perfection of its development; that is, [b]of identifying with each other all phenomena which differ only in degree, and in properties which[b] we suppose to be caused by difference of degree. In order to recognise this identity, or in other words, this exact similarity of quality, the assumption of a type-species is indispensable. We must consider as the type of the class, that among the Kinds included in it, which exhibits the properties constitutive of the class, in the highest degree; conceiving the other varieties as instances of degeneracy, as it were, from that type; deviations from it by inferior intensity of the charac-

[a-a]MS, 43 comprehend
[b-b]MS with all phenomena which differ from it only in degree, & in what

teristic property or properties. For every phenomenon is best studied (*cæteris paribus*) where it exists in the greatest intensity. It is there that the effects which either depend on it, or depend on the same causes with it, will also exist in the greatest degree. It is there, consequently, and only there, that those effects of it, or joint effects with it, can become fully known to us, so that we may [c]learn to[c] recognise their smaller degrees, or even their mere rudiments, in cases in which the direct study would have been difficult or even impossible. Not to mention that the phenomenon in its higher degrees may be attended by effects or collateral circumstances which in its smaller degrees do not occur at all, requiring for their production in any sensible amount a [d]greater degree of intensity of the cause than is there met with[d]. In man, for example, (the species in which both the phenomenon of animal and that of organic life exist in the highest degree,) many subordinate phenomena develop themselves in the course of his animated existence, which the inferior [e]varieties[e] of animals do not show. The knowledge of these properties may [f]nevertheless[f] be of great avail towards the discovery of the conditions and [g]laws[g] of the general phenomenon of life, which is common to man with those inferior animals. And they are, even, rightly considered [h]as[h] properties of animated nature itself; because they may evidently be affiliated to the general laws of animated nature; because we may fairly presume that some rudiments or feeble degrees of those properties would be recognised in all animals by more perfect organs, or even by more perfect instruments, than ours; and because those may be correctly termed properties of a class, which a thing exhibits exactly in proportion as it belongs to the class, that is, in proportion as it possesses the main attributes constitutive of the class.

§ 4. [*How the divisions of the series should be determined*] It remains to consider how the internal distribution of the series may most properly take place: in what manner it should be divided into Orders, Families, and Genera.

The main principle of division must of course be natural affinity; the classes formed must be natural groups: and the formation of these has already been sufficiently treated of. But the principles of natural grouping must be applied in subordination to the principle of a natural series. The groups must not be so constituted as to place in the same group things which ought to occupy different points of the general scale. The precaution necessary to be observed for this purpose is, that the *primary* divisions must be grounded not on all distinctions indiscriminately, but on those which correspond to

[c-c]+43, 46, 51, 56, 62, 65, 68, 72
[d-d]MS degree of intensity of the cause met with there alone
[e-e]65 variety [*printer's error?*]
[f-f]MS yet
[g-g]MS effects
[h-h]+43, 46, 51, 56, 62, 65, 68, 72

variations in the degree of the main phenomenon. The series of Animated Nature should be broken into parts at the [a] points where the variation in the degree of intensity of the main phenomenon (as marked by its principal characters, Sensation, Thought, Voluntary Motion, &c.) begins to be attended by conspicuous changes in the miscellaneous properties of the animal. Such well-marked changes take place, for example, where the class Mammalia ends; at the points where Fishes are separated from Insects, Insects from Mollusca, &c. When so formed, the primary natural groups will compose the series by mere juxtaposition, without redistribution; each of them corresponding to a definite [b]portion[b] of the scale. In like manner each family should, if possible, be so subdivided, that one portion of it shall stand higher and the other lower, though of course contiguous, in the general scale; and only when this is impossible is it allowable to ground the remaining subdivisions on characters having no determinable connexion with the main phenomenon.

Where the principal phenomenon [c]so[c] far transcends in importance all other properties on which a classification could be grounded, as it does in the case of animated existence, any considerable deviation from the rule last laid down is in general sufficiently guarded against by the first principle of a natural arrangement, that of forming the groups according to the most important characters. All attempts at a scientific classification of animals, since [d]first their anatomy and physiology were[d] successfully studied, have been framed with a certain degree of instinctive reference to a natural series, and have accorded in many more points than they have differed, with the classification which would most naturally have been grounded on such a series. But the accordance has not always been complete; and it still is often a matter of discussion, which of several classifications best accords with the true scale of intensity of the main phenomenon. [e]Cuvier, for example, has been justly criticised[e] for having formed his natural groups with an undue degree of reference to the mode of alimentation, a circumstance directly connected only with organic life, and [f]not leading to the arrangement most appropriate[f] for the purposes of an investigation of the laws of animal life, since both carnivorous and herbivorous or frugivorous animals are found at almost every degree in the scale of animal perfection. [g] [h]Blainville's classification has been considered by high authorities to be free from this defect;[h] as

[a]MS, 43, 46 exact
[b-b]MS, 43, 46, 51, 56 division
[c-c]MS as
[d-d]MS their anatomy & physiology was first
[e-e]MS, 43 M. Comte, for example, blames Cuvier [*Cours*, Vol. III, p. 558n]
[f-f]MS, 43, 46 leading to an arrangement most inappropriate
[g]46, 51, 56, 62 M. de
[h-h]MS, 43 M. Comte, with much apparent reason, gives, on these grounds, greatly the preference to the classification framed by M. de Blainville: [*Cours*, Vol. III, pp. 580ff.]

representing correctly, by the mere order of the [i]principal[i] groups, the successive degeneracy of animal nature from its highest to its most imperfect exemplification.

§ 5. [*Zoology affords the completest type of scientific classification*] A classification of any large portion of the field of nature in conformity to the foregoing principles, has hitherto been found practicable only in one great instance, that of animals. In the case [a]even[a] of vegetables, the natural arrangement has not been carried beyond the formation of natural groups. Naturalists have found, and probably will continue to find it impossible to form those groups into [b]any series, the terms of which[b] correspond to real gradations in the phenomenon of vegetative or organic life. Such a difference of degree may be traced between the class of Vascular Plants and that of Cellular, which includes lichens, algæ, and other substances whose organization is simpler and more rudimentary than that of the higher order of vegetables, and which therefore approach nearer to mere inorganic nature. But when we rise much above this point, we do not find any [c]sufficient[c] difference in the degree in which different plants possess the properties of organization and life. The dicotyledons [d]are of more complex structure, and somewhat more perfect organization, than the monocotyledons: and some dicotyledonous families, such as the Compositæ, are rather more complex in their organization than the rest. But the differences are not of a marked character, and do not promise to throw any particular light upon the conditions and laws of vegetable life and development. If they did, the classification of vegetables would have to be made, like that of animals, with reference to the scale or series indicated.[d]

Although the scientific arrangements of organic nature afford as yet the only complete example of the true principles of rational classification, whether as to the formation of groups or of series, those principles are applicable to all cases in which mankind are called upon to bring the various parts of any extensive subject into mental co-ordination. They are as much to the point when objects are to be classed for purposes of art or business,

[i-i]+51, 56, 62, 65, 68, 72
[a-a]+43, 46, 51, 56, 62, 65, 68, 72
[b-b]MS a series, the terms of which should
[c-c]MS, 43, 46, 51, 56 recognisable
[d-d]MS, 43 and the monocotyledones are distinct natural groups, but it cannot be said, even by a metaphor, that the former are more or less plants than the latter. The palm-tree and the oak, the rose and the tulip, are organized and vegetate in a different manner, but certainly not in a different degree. The natural classification of vegetables must therefore continue to be made without reference to any scale or series; and the whole vegetable kingdom must form, as it does in M. Comte's arrangement [see *Cours*, Vol. III, pp. 538ff.], one single step or gradation, the lowest of all in the series of organized beings, scientifically constructed for the purpose of facilitating the investigation of the laws of organic life.] 46, 51, 56 *as* MS . . . any scale or series.

as for those of science. The proper arrangement, for example, of a code of laws, depends on the same scientific conditions as the classifications in natural history; nor could there be a [e]better[e] preparatory discipline for that important function, than the study of the principles of a natural arrangement, not only in the abstract, but in their actual application to the class of phenomena for which they were first elaborated, and which are still the best school for learning their use. Of this the great authority on codification, Bentham, was perfectly aware: and his early *Fragment on Government*,[*] the admirable introduction to a series of writings unequalled in their [f] department, contains clear and just views (as far as they go) on the meaning of a natural arrangement, such as could scarcely have occurred to any one who lived anterior to the age of Linnæus [g]and Bernard de[g] Jussieu.

[*London: Payne, 1776.]

[e-e]MS fitter [*printer's error?*]
[f]MS, 43, 46 peculiar
[g-g]MS , Haller, &

BOOK V

ON FALLACIES

[a] "Errare non modo affirmando et negando, sed etiam sentiendo, et in tacitâ hominum cogitatione contingit." Hobbes, *Computatio sive Logica* [in *Opera Philosophica.* Ed. W. Molesworth. London: Bohn, 1839–45], Chap. v [Vol I, p. 49].

"Il leur semble qu'il n'y a qu'à douter par fantaisie, et qu'il n'y a qu'à dire en général que notre nature est infirme; que notre esprit est plein d'aveuglement; qu'il faut avoir un grand soin de se défaire de ses préjugés, et autres choses semblables. Ils pensent que cela suffit pour ne plus se laisser séduire à ses sens, et pour ne plus se tromper du tout. Il ne suffit pas de dire que l'esprit est foible, il faut lui faire sentir ses foiblesses. Ce n'est pas assez de dire qu'il est sujet à l'erreur, il faut lui découvrir en quoi consistent ses erreurs." Malebranche, *Recherche de la Vérité* [p. 93]. [b]

[a]MS, 43 [*quotations appear in reverse order*]
[b]56, 62 "The Infinite and Absolute are only the names of two counter imbecilities of the human mind, transmuted into properties of the nature of things—of two subjective negations converted into objective affirmations." Sir William Hamilton, ["On the Philosophy of the Unconditioned,"] *Discussions on Philosophy* [p. 21n].

CHAPTER I

Of Fallacies in General

§ 1. [*Theory of fallacies a necessary part of logic*] It is a maxim of the schoolmen, that "contrariorum eadem est scientia:" we never really know what a thing is, unless we are also able to give a sufficient account of its opposite. Conformably to this maxim, one considerable section, in most treatises on Logic, is devoted to the subject of Fallacies; and the practice is too well worthy of observance, to allow of our departing from it. The philosophy of reasoning, to be complete, ought to comprise the theory of bad as well as of good reasoning.

We have endeavoured to ascertain the principles by which the sufficiency of any proof can be tested, and by which the nature and amount of evidence needful to prove any given conclusion can be determined beforehand. If these principles were adhered to, then although the number and value of the truths ascertained would [a]be limited by the opportunities, or by[a] the industry, ingenuity, and patience, of the individual inquirer, at least error would not be embraced instead of truth. But the general consent of mankind, founded on [b] their experience, vouches for their being far indeed from even this negative kind of perfection in the employment of their reasoning powers.

In the conduct of life—in the [c]practical[c] business of mankind—wrong inferences, incorrect interpretations of experience, unless after much culture of the thinking faculty, are absolutely inevitable: and with most people, after the highest degree of culture they ever attain [d], such erroneous inferences, producing [e]corresponding[e] errors in conduct, are lamentably frequent[d]. Even in the speculations to which [f]eminent intellects have systematically devoted[f] themselves, and in reference to which the collective mind of the scientific world is always [g]at hand[g] to aid the efforts and [h]correct[h] the aberrations of

[a-a]MS depend upon the opportunities,
[b]MS, 43, 46 all
[c-c]MS, 43, 46 ordinary
[d-d]MS, 43, 46 (unless where the events of their daily life supply an immediate corrective), such erroneous inferences, are as frequent if not more frequent than correct inferences, correct interpretations of experience
[e-e]51, 56 correspondent
[f-f]MS, 43, 46 the highest intellects systematically devote
[g-g]MS present
[h-h]MS, 43, 46 control

individuals, it is only from the more perfect sciences, from those of which the subject-matter is the least complicated, that opinions not resting on a correct induction have at length, generally speaking, been expelled. In the departments of inquiry relating to the more complex phenomena of [i]nature[i], [j]and[j] especially those of which the subject is man, whether as a moral and intellectual, a social, or even as a physical being; the diversity of opinions still prevalent among instructed persons, and the equal confidence with which those of the most contrary ways of thinking cling to their respective tenets, are [k] proof not only that right modes of philosophizing are not yet generally adopted on those subjects, but that wrong ones are: that [l]inquirers[l] have not only in general missed the truth, but have often embraced error; that even the most cultivated portion of our [m]species[m] have not yet learned to abstain from drawing conclusions [n]which the evidence does not [o]warrant[o][n].

The only complete safeguard against reasoning ill, is the habit of reasoning well; familiarity with [p]the principles[p] of correct reasoning, and practice in applying those principles. It is, however, not unimportant to consider what are the most common modes of bad reasoning; by what appearances the mind is most likely to be seduced from the observance of true principles of induction; what, in short, are the most common and most dangerous varieties of Apparent Evidence, whereby [q]persons[q] are misled into opinions for which there does not exist evidence really conclusive.

A catalogue of the varieties of apparent evidence which are not real evidence, is an enumeration of Fallacies. Without such an enumeration, therefore, the present work would be wanting in an essential point. And while writers who included in their theory of reasoning nothing more than ratiocination, have, in consistency with this limitation, confined their remarks to the fallacies which have their seat in that portion of the process of investigation; we, who profess to treat of the whole process, must add to our directions for performing it [r]rightly[r], warnings against performing it [s]wrongly[s] in any of its parts: whether the ratiocinative or the experimental portion of it be in fault, or the fault lie in dispensing with ratiocination and induction altogether.

§ 2. [*Casual mistakes are not fallacies*] In considering the sources of unfounded inference, it is unnecessary to reckon the errors which arise, not

[i-i]MS, 43, 46 the universe
[j-j]+43, 46, 51, 56, 62, 65, 68, 72
[k]MS, 43, 46 a
[l-l]MS, 43, 46 philosophers
[m-m]MS race
[n-n]MS, 43, 46, 51 for which the evidence is insufficient
[o-o]56 bear out
[p-p]51, 56 principles [*printer's error?*]
[q-q]MS, 43, 46 men
[r-r]MS aright
[s-s]MS, 43 wrong

from a wrong method, [a]nor[a] even from ignorance of the right one, but from a casual lapse, through hurry or inattention, in the application of the true principles of induction. Such errors, like the accidental mistakes in casting up a sum, do not call for philosophical analysis or classification; theoretical considerations can throw no light upon the means of avoiding them. In the present treatise our attention is required, not to mere inexpertness in performing the operation in the right way, (the only remedies for which are increased attention and more sedulous practice,) but to the modes of performing it in a way fundamentally wrong; the conditions under which the human mind persuades itself that it has sufficient grounds for a conclusion which it has not arrived at by any of the legitimate methods of induction—which it has not, even carelessly or overhastily, endeavoured to test by those legitimate methods.

§ 3. [*The moral sources of erroneous opinion, how related to the intellectual*] There is another branch of what may be called the Philosophy of Error, which must be mentioned here, though only to be excluded from our subject. The sources of erroneous opinions are twofold, moral and intellectual. Of these, the moral do not fall within the compass of this work. They may be classed under two general heads; Indifference to the attainment of truth, and Bias: of which last the most common case is that in which we are biassed by our wishes; but the liability is almost as great to the undue adoption of a conclusion which is disagreeable to us, as of one which is agreeable, if it be of a nature to bring into action any of the stronger passions. Persons of timid character are the more predisposed to believe any statement, the more it is calculated to alarm them. Indeed it is a psychological law, deducible from the most general laws of the mental constitution of man, that any strong passion renders us credulous as to the existence of objects suitable to excite it.

But the moral causes of [a]opinions, though with most persons the most powerful of all[a], are but remote causes: they do not act [b]directly[b], but by means of the intellectual causes; to which they bear the same relation that the circumstances called, in the theory of medicine, *predisposing* causes, bear to *exciting* causes. Indifference to truth cannot, in and by itself, produce erroneous belief; it operates by preventing the mind from collecting the proper evidences, or from applying to them the test of a legitimate and rigid induction; by which omission it is exposed unprotected to the influence of

[a–a]MS, 43, 46 or

[a–a]MS, 43, 46 our opinions, though real and most powerful] 51 opinions . . . *as* MS

[b–b]MS, 43, 46 immediately

any species of apparent evidence which [c]offers itself[c] spontaneously, or which is elicited by that smaller quantity of trouble which the mind may be [d]willing[d] to take. As little is Bias a direct source of wrong conclusions. We cannot believe a proposition only by wishing, or only by dreading, to believe it. The most violent inclination to find a set of propositions true, will not enable the weakest of mankind to believe them without a vestige of intellectual grounds —without any, even apparent, evidence. It [e]acts[e] indirectly, by placing the intellectual grounds of belief in an incomplete or distorted shape before his eyes. It makes him shrink from the irksome labour of a rigorous induction, when he has a misgiving that its result may be disagreeable; and in such examination as he does institute, it makes him exert that which *is* in a certain measure voluntary, his attention, unfairly, giving a larger share of it to the evidence which seems favourable to the desired conclusion, a smaller to that which seems unfavourable. [f]It operates, too, by making him look out eagerly for reasons, or apparent reasons, to support opinions which are conformable, or resist those which are repugnant, to his interests or feelings; and when the interests or feelings are common to great numbers of persons, reasons are accepted and pass current, which would not for a moment be listened to in that character if the conclusion had nothing more powerful than its reasons to speak in its behalf. The natural or acquired partialities of mankind are continually throwing up philosophical theories, the sole recommendation of which consists in the premises they afford for proving cherished doctrines, or justifying favourite feelings: and when any one of these theories has been so thoroughly discredited as no longer to serve the purpose, another is always ready to take its place. This propensity, when exercised in favour of any widely-spread persuasion or sentiment, is often decorated with complimentary epithets; and the contrary habit of keeping the judgment in complete subordination to evidence, is stigmatized by various hard names, as scepticism, immorality, coldness, hard-heartedness, and similar expressions according to the nature of the case. But though the opinions of the generality of mankind, when not dependent on mere habit and inculcation, have their root much more in the inclinations than in the intellect, it is a necessary condition to the triumph of the moral bias that it should first pervert the understanding. Every[f] erroneous inference, though originating in moral causes, involves the intellectual operation of admitting insufficient evidence

[c-c]MS, 43, 46, 51, 56 occurs
[d-d]MS, 43, 46, 51, 56 not unwilling
[e-e]MS, 43, 46, 51 can only act
[f-f]MS, 43, 46, 51 And the like when the bias arises not from desire but fear. Although a person afraid of ghosts believes that he has seen one on evidence wonderfully inadequate, he does not believe it altogether without evidence; he has perceived some unusual appearance, while passing through a church-yard: he saw something start up near a grave which looked white in the moonshine. Thus every

as sufficient; and whoever [g]was[g] on his guard against all kinds of inconclusive evidence which can be mistaken for conclusive, would be in no danger of being led into error even by the strongest bias. There [h]are[h] minds so strongly fortified on the intellectual side, that they could not blind themselves to the light of truth, however really desirous of doing so; they could not, with all the inclination in the world, pass off upon themselves bad arguments for good ones. If the sophistry of the intellect could be rendered impossible, that of the feelings, having no instrument to work with, would be powerless. A comprehensive classification of all those things which, not being evidence, are liable to appear such to the understanding, will, therefore, [i]of itself[i] include all errors of judgment arising from moral causes, to the exclusion only of errors of practice committed against better knowledge.

To examine, then, the various kinds of apparent evidence which are not evidence at all, and of apparently conclusive evidence which do not really amount to conclusiveness, is the object of that part of our inquiry into which we are about to enter.

The subject is not beyond the compass of classification and comprehensive survey. The things, indeed, which are not evidence of any given conclusion, are manifestly endless, and this negative property, having no dependence on any positive ones, cannot be made the groundwork of a real classification. But the things which, not being evidence, are susceptible of being mistaken for it, are capable of a classification having reference to the positive property which they possess of appearing to be evidence. We may arrange them, at our choice, on either of two principles; according to the cause which makes them appear [j]to be[j] evidence, not being so; or according to the particular kind of evidence which they simulate. The Classification of Fallacies which will be attempted in the ensuing chapter, is founded on these considerations jointly.

[g-g]MS were
[h-h]MS, 43, 46 have been
[i-i]+68, 72
[j-j]+68, 72

CHAPTER II

Classification of Fallacies

§ 1. [*On what criteria a classification of fallacies should be grounded*] In attempting to establish certain general distinctions which shall mark out from one another the various kinds of Fallacious Evidence, we propose to ourselves an altogether different aim from that of several eminent thinkers, who have given, under the name of Political or other Fallacies, a mere enumeration of a certain number of erroneous opinions; false general propositions which happen to be often met with; *loci communes* of bad arguments on some particular subject. Logic is not concerned with the false opinions which [a]people[a] happen to entertain, but with the manner in which they come to entertain them. The question [b]is not, what facts have at any time been[b] erroneously supposed to be [c] proof of certain other facts, but what property in the facts it was which led [d]any one[d] to this mistaken supposition.

When a fact is supposed, though incorrectly, to be evidentiary of, or a mark of, some other fact, there must be a cause of the error; the supposed evidentiary fact must be connected in some particular manner with the fact of which it is deemed evidentiary,—must stand in some particular relation to it, without which relation it would not be regarded in that light. The relation may either be one resulting from the simple contemplation of the two facts side by side with one another, or it may depend on some process of [e] mind, by which a previous association has been established between them. Some peculiarity of relation, however, there must be; the fact which can, even by the wildest aberration, be supposed to prove another fact, must stand in some special position with regard to it; and if we could ascertain and define that special position, we should perceive the origin of the error.

We cannot regard one fact as evidentiary of another, unless we believe that the two are always, or in the majority of cases, conjoined. If we believe A to be evidentiary of B, if [f]when[f] we see A we are inclined to infer B from it, the reason is because we believe that wherever A is, B also either always or for the most part exists, either as an antecedent, a consequent, or a concomitant. If when we see A we are inclined not to expect B—if we believe A

[a-a]MS, 43, 46 men
[b-b]MS, 43, 46 for us is not, what facts men have at any time
[c]MS a
[d-d]MS, 43, 46 them
[e]MS, 43, 46 our own
[f-f]MS where [*printer's error?*]

to be evidentiary of the absence of B—it is because we believe that where A is, B either is never, or at least seldom, found. Erroneous conclusions, in short, no less than correct conclusions, have an invariable relation to a general formula, either expressed or tacitly implied. When we infer some fact from some other fact which does not really prove it, we either have admitted, or, if we maintained consistency, ought to admit, some groundless general proposition respecting the conjunction of the two phenomena.

For every property, therefore, in facts, or in our mode of considering facts, which leads us to believe that they are habitually conjoined when they are not, or that they are not when in reality they are, there is a corresponding kind of Fallacy; and an enumeration of fallacies would consist in a specification of those properties in facts, and those peculiarities in our [g]mode[g] of considering them, which give rise to this erroneous opinion.

§ 2. [*The five classes of fallacies*] To begin, then; the supposed connexion, or repugnance, between the two facts, may either be a conclusion from evidence (that is, from some other proposition or propositions), or may be admitted without any such ground; admitted, as the phrase is, on its own evidence; embraced as self-evident, as an axiomatic truth. This gives rise to the first great distinction, that between Fallacies of Inference, and Fallacies of Simple Inspection. In the latter division must be included not only all cases in which a proposition is believed and held for true, literally without any extrinsic evidence, either of specific experience or general reasoning; but those more frequent cases in which simple inspection creates a *presumption* in favour of a proposition; not sufficient for belief, but sufficient to cause the strict principles of a regular induction to be dispensed with, and creating a predisposition to believe it on evidence which would be seen to be insufficient if no such presumption existed. This class, comprehending the whole of what may be termed Natural Prejudices, and which I shall call indiscriminately Fallacies of Simple Inspection or Fallacies *à priori*, shall be placed at the head of our list.

Fallacies of Inference, or erroneous conclusions from supposed evidence, must be subdivided according to the nature of the apparent evidence from which the conclusions are drawn; or (what is the same thing) according to the particular kind of sound argument which the fallacy in question simulates. But there is a distinction to be first drawn, which does not answer to any of the divisions of sound arguments, but arises out of the nature of bad ones. We may know exactly what our evidence is, and yet draw a false conclusion from it; we may conceive [a] precisely what our premises are, what alleged matters of fact, or general principles, are the foundation of our inference; and yet, because the premises are false, or because we have inferred from them what they will not support, our conclusion may be erroneous. But a

[g-g]MS modes [a]MS most

case, perhaps even more frequent, is that in which the error arises from not conceiving our premises with due clearness, that is, (as shown in the preceeding Book,*) with due fixity: forming one conception of our evidence when we collect or receive it, and another when we make use of it; or unadvisedly, and in general unconsciously, substituting, as we proceed, different premises in the place of those with which we set out [b], or a different conclusion for that which we undertook to prove[b]. This gives existence to a class of fallacies which may be justly termed [c](in a phrase borrowed from Bentham)[c] Fallacies of Confusion;[*] comprehending, among others, all those which have their source in language, whether arising from the vagueness or ambiguity of our terms, or from casual associations with them.

When the fallacy is not one of Confusion, that is, when the proposition believed, and the evidence on which it is believed, are steadily apprehended and unambiguously expressed, there remain to be made two cross divisions [d] . The Apparent Evidence may be either particular facts, or foregone generalizations; that is, the process may simulate either simple Induction, or Deduction; and again, the evidence, whether consisting of [e]supposed facts or of[e] general propositions, may be false in itself, or, being true, may fail to bear out the conclusion attempted to be founded on it. This gives us first, Fallacies of Induction and Fallacies of Deduction, and then a subdivision of each of these, according as the supposed evidence is false, or true but inconclusive.

Fallacies of Induction, where the facts on which the induction proceeds are erroneous, may be termed Fallacies of [f] Observation. The term is not strictly accurate, or rather, not accurately coextensive with the class of fallacies which [g]I[g] propose to designate by it. Induction is not always grounded on facts immediately observed, but sometimes on facts inferred: and when these last are erroneous, the error [h]may not be[h], in the literal sense of the term, an instance of bad observation, but of bad inference. It will be convenient, however, to make only one class of all [i]the inductions of[i] which the error lies in not sufficiently ascertaining the facts on which the theory is grounded; whether the cause of failure be mal-observation, or simple non-observation, and whether the mal-observation be direct, or by means of intermediate marks which do not prove what they are supposed to prove. And in the absence of any comprehensive term to denote the ascertainment, by whatever means, of the facts on which an induction is grounded, I will venture to retain for this class of fallacies, under the explanation [j]now[j] given, the title [k]of[k] Fallacies of [l] Observation.

*Supra, pp. 658–9.

[*Book of Fallacies, p. 213.]

b–b+43, 46, 51, 56, 62, 65, 68, 72
c–c+68, 72
dMS, 43, 46, 51, 56, 62, 65 , giving rise to four classes
e–eMS, 43, 46 facts or] 51, 56, 62, 65 facts or of
fMS Bad
g–gMS we
h–hMS, 43, 46, 51, 56 is not
i–iMS induction in
j–jMS, 43, 46, 51, 56 already
k–k+62, 65, 68, 72
lMS Bad

The other class of inductive fallacies, in which the facts are correct, but the conclusion not warranted by them, are properly denominated Fallacies of [m] Generalization: and these, again, fall into various subordinate classes or natural groups, some of which will be enumerated in their proper place.

When we now turn to Fallacies of Deduction, namely, those modes of incorrect argumentation in which the premises, or some of them, are general propositions, and the argument a ratiocination; we may of course subdivide these also into two species similar to the two preceding, namely, those which proceed on false premises, and those of which the premises, though true, do not support the conclusion. But of these species, the first must necessarily fall [n]under[n] some one of the heads already enumerated. For the error must be either in those premises which are general propositions, or in those which assert individual facts. In the former case it is an Inductive Fallacy, of one or the other class; in the latter it is a Fallacy of [o] Observation: unless, in either case, the erroneous premise has been assumed on simple inspection, in which case the fallacy is *à priori*. Or finally, the premises, of whichever kind they are, may never have been conceived in so distinct a manner as to produce any clear consciousness by what means they were arrived at; as in the case of what is called reasoning in a circle: and then the fallacy is [p]one[p] of Confusion.

There [q]remain[q], therefore, as the only class of fallacies having properly their seat in deduction, those in which the premises of the ratiocination do not bear out its conclusion; the various cases, in short, of vicious argumentation, provided against by the rules of the syllogism. We shall call these, Fallacies of [r] Ratiocination.

We have thus five distinguishable classes of fallacy, which may be expressed in the following synoptic table:

Fallacies
- of Simple Inspection - - - - 1. Fallacies *à priori*.
- of Inference
  - from evidence distinctly conceived
    - Inductive Fallacies
      - 2. Fallacies of [s] Observation.
      - 3. Fallacies of [t] Generalization.
    - Deductive Fallacies
      - 4. Fallacies of [u] Ratiocination.
  - from evidence indistinctly conceived - - - - - 5. Fallacies of Confusion.

[m]MS Bad
[o]MS Bad
[q–q]MS, 43 remains
[s]MS Bad
[u]MS Bad
[n–n]MS, 43, 46 within
[p–p]+51, 56, 62, 65, 68, 72
[r]MS Bad
[t]MS Bad

§ 3. [*The reference of a fallacy to one or* [a]*another*[a] *class is sometimes arbitrary*] We must not, however, expect to find that men's actual errors always, or even commonly, fall so unmistakeably under some one of these classes, as to be incapable of being referred to any other. Erroneous arguments do not admit of such a sharply cut division as valid arguments do. An argument fully stated, with all its steps distinctly set out, in language not susceptible of misunderstanding, must, if it be erroneous, be so in some one [b]of these five modes unequivocally[b]: or indeed of the first four, since the fifth, on such a supposition, would vanish. But it is not in the nature of bad reasoning to express itself thus unambiguously. When a sophist, whether he is imposing on himself or attempting to impose on others, can be constrained to throw his sophistry into so distinct a form, it needs, in a large proportion of cases, no further exposure.

In all arguments, everywhere but in the schools, some of the links are suppressed; *à fortiori* when the arguer either intends to deceive, or is a lame and inexpert thinker, little accustomed to bring his reasoning processes to any test: and it is in those steps of the reasoning which are made in this tacit and half-conscious, or even wholly unconscious manner, that the error oftenest lurks. In order to detect the fallacy, the proposition thus silently assumed must be supplied; but the reasoner, most likely, has never really asked himself what he was assuming: his confuter, [c]unless permitted[c] to extort it from him by the Socratic mode of interrogation, must himself judge what the suppressed premise ought to be in order to support the conclusion. And hence, in the words of Archbishop Whately,

> it must be often a matter of doubt, or rather, of arbitrary choice, not only to which genus each *kind* of fallacy should be referred, but even to which kind to refer any *one individual* fallacy; for since, in any course of argument, one premise is usually suppressed, it frequently happens in the case of a fallacy, that the hearers are left to the alternative of supplying *either* a premise which is *not true*, or *else*, one which *does not prove* the conclusion: *e.g.* if a man expatiates on the distress of the country, and thence argues that the government is tyrannical, we must suppose him to assume *either* that 'every distressed country is under a tyranny,' which is a manifest falsehood, *or* merely that 'every country under a tyranny is distressed,' which, however true, proves nothing, the middle term being undistributed.

The former would be ranked, in our distribution, among fallacies of [d] generalization, the latter among those of [e] ratiocination. "Which are we to suppose the speaker meant us to understand? Surely" (if he understood him-

[a-a]MS, 43, 46 *other*
[b-b]MS, 43, 46, 51 , and one only, of these five modes
[c-c]MS, 43, 46 if unable
[d]MS Bad
[e]MS Bad

self) "just whichever each of his hearers might happen to prefer: some might assent to the false premise; others allow the unsound syllogism."[*]

Almost all fallacies, therefore, might in strictness be brought under our fifth class, Fallacies of Confusion. A fallacy can seldom be absolutely referred to any of the other classes; we can only say, that if all the links were filled up which should be capable of being supplied in a valid argument, it would either stand thus (forming a fallacy of one class), or thus (a fallacy of another); or at furthest we may say, that the conclusion is most *likely* to have originated in a fallacy of such and such a class. Thus in [f]the illustration just quoted[f], the error committed may be traced with most probability to a fallacy of [g] generalization; that of mistaking an uncertain mark, or piece of evidence, for a certain one; concluding from an effect to some one of its possible causes, when there are others which would have been equally capable of producing it.

Yet, though the five classes run into each other, and a particular error often seems to be arbitrarily assigned to one of them rather than to any of the rest, there is considerable use in so distinguishing them. We shall find it convenient to set apart, as Fallacies of Confusion, those of which confusion is the most obvious characteristic; in which no other cause can be assigned for the mistake committed, than neglect or inability to state the question properly, and to apprehend the evidence with definiteness and precision. In the remaining four classes [h]I[h] shall place not only the [i] cases in which the evidence is clearly seen to be what it is, and yet a wrong conclusion drawn from it, but also those in which, although there be confusion, the confusion is not the sole cause of the error, but there is some shadow of a ground for it in the nature of the evidence itself. And in distributing these cases of partial confusion among the four classes, [j]I[j] shall, when there can be any hesitation as to the precise seat of the fallacy, suppose it to [k]be[k] in that part of the process in which, from the nature of the case, and the [l]tendencies[l] of the human mind, an error would in the particular circumstances be the most probable.

After these observations we shall proceed, without further preamble, to consider the five classes in their order.

[*Elements of Logic*, 9th ed., p. 159; 1st ed., pp. 136–7.]

[f-f]MS, 43 Archbishop Whately's illustration
[g]MS Bad
[h-h]MS we
[i]MS, 43, 46 comparatively few
[j-j]MS we
[k-k]MS lie [*printer's error?*]
[l-l]MS, 43, 46 known infirmities

CHAPTER III

Fallacies of Simple Inspection; or *a priori* Fallacies

§ 1. [*Character of this class of fallacies*] The tribe of errors of which we are to treat in the first instance, are those in which no actual inference takes place at all: the proposition (it cannot in such cases be called a conclusion) being embraced, not as proved, but as requiring no proof; as a self-evident truth; or else as having such intrinsic verisimilitude, that external evidence not in itself amounting to proof, is sufficient in aid of the antecedent presumption.

An attempt to treat this subject comprehensively would be a transgression of the bounds prescribed to this work, since it would necessitate the inquiry which, more than any other, is the grand question of [a]what is called[a] metaphysics, viz. What are the propositions which may reasonably be received without proof? That there must be some such propositions all are agreed, since there cannot be an infinite series of proof, a chain suspended from nothing. But to determine what these propositions are, is the *opus magnum* of the [b]more recondite[b] mental philosophy. Two principal divisions of opinion on the subject have divided the schools of philosophy from its first dawn. The one recognises no ultimate premises but the facts of our subjective consciousness; our sensations, emotions, intellectual states of mind, and volitions. These, and whatever by [c] strict rules of induction can be derived from these, it is possible, according to this theory, for us to know; of all else we must remain in ignorance. The opposite school hold that there are other existences, suggested indeed to our minds by these subjective phenomena, but not inferrible from them, by any process either of deduction or of induction; which, however, we must, by the constitution of our mental nature, recognise as realities; and realities, too, of a higher order than the phenomena of our consciousness, being the efficient causes and necessary substrata of all Phenomena. Among these entities they reckon Substances, whether matter or spirit; from the dust under our feet to the soul, and from that to [d] Deity.

[a-a]MS, 43, 46 transcendental
[b-b]MS, 43, 46 higher
[c]MS, 43, 46 the
[d]MS, 43, 46 the

All these, according to them, are preternatural or supernatural beings, having no likeness in experience, though experience is [e]entirely a[e] manifestation of their agency. Their existence, together with more or less of the laws to which they conform in their operations, are [f], on this theory,[f] apprehended and recognised as real by the mind itself intuitively: experience (whether in the form of sensation or of mental feeling) having no other part in the matter than as affording [g] facts which are consistent with these necessary postulates of reason, and which are explained and accounted for by them.

As it is foreign to the purpose of the present treatise to [h]decide between these conflicting[h] theories, we are precluded from inquiring into the existence, or defining the extent and limits, of knowledge *à priori*, and from characterizing the kind of correct assumption [i] which the fallacy of incorrect assumption, now under consideration, simulates. Yet since it is allowed on both sides that such assumptions are [j]often[j] made improperly, we may find it practicable, without entering into the ultimate metaphysical grounds of the discussion, to state some speculative propositions, and suggest some practical cautions, [k] respecting the forms in which such unwarranted assumptions are most likely to be made.

§ 2. [*Natural prejudice of mistaking subjective laws for objective, exemplified in popular superstitions*] In the cases in which, according to the [a]thinkers[a] of the ontological school, the mind apprehends, by intuition, things, and the laws of things, not cognizable by our sensitive faculty; those intuitive, or supposed intuitive, perceptions are undistinguishable from what the opposite school are accustomed to call ideas of the mind. When they themselves say that they perceive the things by an immediate act of a faculty given for that purpose [b]by their Creator[b], it would be said of them by their opponents that they find an idea or conception in their own minds, and from the idea or conception, infer the existence of a corresponding objective reality. Nor would this be an unfair statement [c], but a mere version into other words of the account given by [d]many of[d] themselves; and one to which the more clear-sighted of them might, and generally do, without hesitation, subscribe. Since, therefore, in the cases which lay the strongest [e]claims[e] to be

[e-e]MS a mere
[f-f]+43, 46, 51, 56, 62, 65, 68, 72
[g]MS, 43, 46 a multitude of
[h-h]MS, 43, 46 determine on which side the truth lies as between these
[i]MS, 43, 46, 51, 56 (if any such there be)
[j-j]MS, 43, 46 occasionally
[k]MS, 43, 46 (not absolutely inconsistent with either view of the philosophical question)
[a-a]MS, 43, 46 philosophers
[b-b]MS, 43, 46, 51, 56 at their creation
[c]MS of what they do
[d-d]+62, 65, 68, 72
[e-e]MS, 43, 46, 51 claim

examples of knowledge *à priori*, the mind proceeds from the idea of a thing to the reality of the thing itself, we cannot be surprised by finding that illicit assumptions *à priori* consist in doing the same thing erroneously: in mistaking subjective facts for objective, laws of the percipient mind for laws of the perceived object, properties of the ideas or conceptions for properties of the things conceived.

Accordingly, a large proportion of the erroneous thinking which exists in the world proceeds on a tacit assumption, that the same order must obtain among the objects in nature which obtains among our ideas of them. That if we always think of two things together, the two things must always exist together. That if one thing makes us think of another as preceding or following it, that other must precede it or follow it in actual fact. And conversely, that when we cannot conceive two things together they cannot exist together, and that their combination may, without further evidence, be rejected from the list of possible occurrences.

Few persons, I am inclined to think, have reflected on the great extent to which this fallacy has prevailed, and prevails, in the actual beliefs and actions of mankind. For a first illustration of it, we may refer to a large class of popular superstitions. If any one will examine in what [f]circumstances[f] most of those things agree, which in different ages and by different portions of the human race have been considered as omens or prognostics of some interesting event, whether calamitous or fortunate; [g]they will be found[g] very generally characterized by this peculiarity, that they cause the mind to *think* of that, of which they are therefore supposed to forebode the actual occurrence. "Talk of the devil, and he will appear," has passed into a proverb. Talk of the devil, that is, raise the idea, and the reality will follow. In times when the appearance of that personage in a visible form was thought to be no [h]unfrequent[h] occurrence, it has doubtless often happened to persons of vivid imagination and susceptible nerves, that talking of the devil has caused them to fancy they saw him; as, even in our [i]more[i] incredulous days, listening to ghost stories predisposes us to see [j]ghosts[j]; and thus, as a prop to the *à priori* fallacy, there might come to be added an auxiliary fallacy of malobservation, with one of false generalization grounded on it. Fallacies of different orders often herd or cluster together in this fashion [k], one smoothing the way for another[k]. But the origin of the superstition is evidently that which we have assigned. In like manner it has been universally considered unlucky to speak of misfortune. The day on which any calamity happened has been considered an unfortunate day, and there has been a feeling everywhere, and in some nations a religious obligation, against transacting any important

[f-f]MS, 43 circumstance
[g-g]MS, 43, 46 he will find them
[h-h]MS, 43, 46, 51, 56 uncommon
[i-i]+68, 72
[j-j]MS a ghost
[k-k]+51, 56, 62, 65, 68, 72

business on that day. For on such a day our thoughts are likely to be of misfortune. For a similar reason, any untoward occurrence in commencing an undertaking has been considered ominous of failure; and often, doubtless, has really contributed to it, by putting the persons engaged in the enterprise more or less out of spirits: but the belief has equally prevailed where the disagreeable circumstance was, independently of superstition, too insignificant to depress the spirits by any influence of its own. All know the story of Cæsar's accidentally stumbling in the act of landing on the African coast; and the presence of mind [l]with[l] which he converted the direful presage into a favourable one by exclaiming, "Africa, I embrace thee."[*] Such omens, it is true, were often conceived as warnings of the future, given by a friendly or a hostile deity; but this very superstition grew out of a pre-existing tendency; the god was supposed to send, as an indication of what was to come, something which [m]people were already disposed[m] to consider in that light. So in the case of lucky or unlucky names. Herodotus tells [n]us[n] how the Greeks, on [o]the[o] way to Mycale, were encouraged in their enterprise by the arrival of a deputation from Samos, one of the members of which was named Hegesistratus, the leader of armies.[†]

Cases may be pointed out in which something which could have no real effect but to make persons *think* of misfortune, was regarded not merely as a prognostic, but as something approaching to an actual cause of it. The εὐφήμει of the Greeks, and *favete linguis*, or *bona verba quæso*, of the Romans, evince the care with which they endeavoured to repress the utterance of any word expressive or suggestive of ill fortune; not from notions of delicate politeness, to which their general mode of conduct and feeling had very little reference, but from *bonâ fide* alarm lest the event so suggested to the imagination should in fact occur. Some vestige of a similar superstition has been known to exist among uneducated persons even in our own day: it is thought an unchristian thing to talk of, or suppose, the death of any person while he is alive. It is known how careful the Romans were to avoid, by an indirect mode of speech, the utterance of any word directly expressive of death or other calamity: how instead of *mortuus est* they said *vixit*; and "be the event fortunate or *otherwise*" instead of *adverse*. The name Maleventum, of which Salmasius so sagaciously detected the Thessalian origin (Μαλόεις, Μαλοέντος), they changed into the highly propitious denomination, Beneventum; [p]Egesta into Segesta;[p] and Epidamnus, a name so [q]interesting[q] in its

[*See Suetonius. *De Vita Caesarum*. In *Suetonius*. Tr. J. C. Rolfe. London: Heinemann, 1914, p. 82 (Bk. I, Chap. lix).]
[†Tr. Henry Cary. London: Bohn, 1849, p. 580 (IX, 91).]

[l-l]MS by
[m-m]MS, 43, 46 men were already inclined
[n-n]+65, 68, 72
[o-o]MS their
[p-p]+56, 62, 65, 68, 72
[q-q]MS, 43, 46 pleasant

associations to the reader of Thucydides,[*] they exchanged for Dyrrhachium, to escape the perils of a word suggestive of *damnum* or detriment.

"If an hare cross the highway," says Sir Thomas Browne,* "there are few above threescore that are not perplexed thereat; which notwithstanding is but an augurial terror, according to that received expression, *Inauspicatum dat iter oblatus lepus*. And the ground of the conceit was probably no greater than this, that a fearful animal passing by us portended unto us something to be feared; as upon the like consideration the meeting of a fox presaged some future imposture." Such superstitions as these last must be the result of study; they are too recondite for natural or spontaneous growth. But when the attempt [r]was once made[r] to construct a science of predictions, any association, though [s]ever[s] so faint or remote, by which an object could be connected in however far-fetched a manner with ideas either of prosperity or of danger and misfortune, was enough to determine its being classed among good or evil omens.

An example of rather a different kind from any of these, but falling under the same principle, is the famous attempt on which so much labour and ingenuity were expended by the alchemists, to make gold potable. The motive to this was a conceit that potable gold could be no other than the universal medicine: and why gold? Because it was so precious. It must have all marvellous properties as a physical substance, because the mind was already accustomed to marvel at it.

From a similar feeling, "every substance," says Dr. Paris,† "whose origin is involved in mystery, has at different times been eagerly applied to the purposes of medicine. Not long since, one of those showers which are now known to consist of the excrements of insects, fell in the north of Italy; the inhabitants regarded it as manna, or some supernatural panacea, and they swallowed it with such avidity, that it was only by extreme address that a small quantity was obtained for a chemical examination." The superstition, in this instance, though doubtless partly of a religious character, probably in part also arose from the prejudice that a wonderful thing must of course have wonderful properties.

§ 3. [*Natural prejudices, that things which we think of together must exist together, and that what is inconceivable must be false*] The instances of *à priori* fallacy which we have hitherto cited belong to the class of vulgar

[**History of the Peloponnesian War*. Ed. C. Foster Smith. 4 vols. London: Heinemann, 1919–23, Vol. I, pp. 42ff. (Bk. I, Chaps. xxivff.)]

*[*Pseudodoxia Epidemica*, or] *Vulgar Errors* [2nd ed. London: Dod and Ekins, 1650], Bk. V, Chap. xxi [p. 224].

†*Pharmacologia*, "Historical Introduction," p. 16.

[r-r]MS had begun [s-s]MS, 43, 46, 51 never

errors, and do not now, nor in any but a rude age ever could, impose upon minds of any considerable attainments. But those to which we are about to proceed, have been, and still are, all but universally prevalent [a] among [b]thinkers[b]. The same disposition to give objectivity to a law of the mind—to suppose that what is true of our ideas of things must be true of the things themselves—exhibits itself in many of the most accredited modes of philosophical investigation, both on physical and on metaphysical subjects. In one of its most undisguised manifestations, it embodies itself in two maxims, which lay claim to axiomatic truth: Things which we cannot think of together, cannot coexist; and Things which we cannot help thinking of together, must coexist. I am not sure that the maxims were ever expressed in these precise words, but the history both of philosophy and of popular opinions abounds with exemplifications of both forms of the doctrine.

To begin with the latter of them: Things which we cannot think of except together, must exist together. This is assumed in the [c]generally received and accredited mode of reasoning which concludes[c] that A must accompany B in point of fact, because "it is involved in the idea." [d]Such thinkers[d] do not reflect that the idea, being a result of abstraction, ought to conform to the facts, and cannot make the facts conform to it. The argument is at most admissible as an appeal to authority; a surmise, that what is now part of the idea, must, before it became so, have been found by previous inquirers in the facts. Nevertheless, the philosopher who more than all others [e]made professions[e] of rejecting authority, Descartes, constructed his [f] system on this very basis. His favourite device for arriving at truth, even in regard to outward things, was by looking into his own mind for it. "Credidi me," says his celebrated maxim, "pro regulâ generali sumere posse, omne id quod valdè dilucidè et distinctè concipiebam, verum esse;"[*] whatever can be very clearly conceived must certainly exist; that is, as he afterwards explains it, if the idea includes existence. And on this ground he infers that geometrical figures really exist, because they can be distinctly conceived. Whenever existence is "involved in an idea," a thing conformable to the idea must really exist; which is as much as to say, whatever the idea contains must have its equivalent in the thing; and what we are not able to leave out of the idea cannot be absent from the reality.* This assumption pervades the philosophy not

[*René Descartes. *Dissertatio de methodo.* Amsterdam: Elzevir, 1677, p. 21.]

*[51] [g]The author of one of the Bridgewater Treatises has fallen, as it seems to me, into a similar fallacy when, after arguing in rather a curious way to prove

[a]MS, 43 even   [b-b]MS, 43, 46 philosophers
[c-c]MS, 43, 46 many reasonings of philosophers which conclude
[d-d]MS They
[e-e]MS, 43, 46 has made profession] 51, 56, 62 made profession
[f]MS, 43, 46 philosophical
[g-g752]MS, 43, 46 [*partly in text; see variant [i] below*]

only of Descartes, but of all the thinkers who received their impulse mainly from him, in particular the two most remarkable among them, [h]Spinoza and Leibnitz[h], from whom the modern German metaphysical philosophy is essentially an emanation. [i] [j]I am indeed disposed to think that the fallacy now under consideration has been the cause of two-thirds of the bad philosophy, and especially of the bad metaphysics, which the human mind has never ceased to produce. Our general ideas contain nothing but what has been put into them, either by our passive experience, or by our active habits of thought; and the metaphysicians in all ages, who have attempted to construct the laws of the universe by reasoning from our supposed necessities of thought, have always proceeded, and only could proceed, by laboriously finding in their own minds what they themselves had formerly put there, and evolving from their ideas of things what they had first involved in those ideas. In this way all deeply-rooted opinions and feelings are enabled to create apparent demonstrations of their truth and reasonableness, as it were out of their own substance.[j]

The other form of the fallacy; Things which we cannot think of together cannot exist together,—including as one of its branches, that what we cannot think of as existing cannot exist at all,—may [k]thus be[k] briefly expressed: Whatever is inconceivable must be false.

Against this prevalent doctrine I have [l]sufficiently argued[l] in a former Book,* and nothing is required in this place but examples. It was long held that Antipodes were impossible because of the difficulty which [o]was[o] found in conceiving [p] persons with their heads in the same direction as our feet. And it was one of the received arguments against the Copernican system, that we

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that matter may exist without any of the known properties of matter, and may therefore be changeable, he concludes that it cannot be eternal, because "eternal (passive) existence necessarily involves incapability of change." [See William Prout. *Chemistry, Meteorology, and the Function of Digestion.* London: Pickering, 1834, p. 87.] I believe it would be difficult to point out any other connexion between the facts of eternity and unchangeableness, than a strong association between the two ideas. Most of the *à priori* arguments, both religious and anti-religious, on the origin of things, are fallacies drawn from the same source.[g]

*Supra, Bk. II, Chap. v, §6, and Chap. vii, §§1, 2, 3 [m], 4[m]. [n]See also *Examination of Sir William Hamilton's Philosophy*, Chap. vi and elsewhere.[n]

[h-h]MS, 43, 46, 51, 56 Leibnitz and Spinosa

[i]MS, 43 The esteemed author of one of the *Bridgewater Treatises* (which for its accumulation of scientific facts, and even for some of its generalizations, is worthy of all praise) has fallen . . . *as* 751n . . . between the two ideas.] 46 *as* 751n . . . between the two ideas.

[j-j]+51, 56, 62, 65, 68, 72

[k-k]MS, 43, 46, 51, 56, 62 be thus

[l-l]MS protested

[m-m]+68, 72

[n-n]+65, 68, 72

[o-o]MS, 43, 46 men

[p]MS or imagining

cannot conceive so great a void space as that system supposes to exist in the celestial regions. When men's imaginations had always been used to conceive the stars as firmly set in solid spheres, they naturally found much difficulty in imagining them in so different, and, as it doubtless appeared to them, so [q]precarious[q] a situation. But [r]they[r] had no right to mistake the limitation (whether natural, or, as it in fact proved, only artificial) of their own faculties, for an inherent limitation of the possible modes of existence in the universe.

It may be said in objection, that the error in these cases was in the minor [s]premise[s], not the major; an error of fact, not of principle; that it did not consist in supposing that what is inconceivable cannot be true, but in supposing antipodes to be inconceivable, when present experience [t] proves that they can be conceived. Even if this objection were allowed, and the proposition that what is inconceivable cannot be true were suffered to remain unquestioned as a speculative truth, it would be a truth on which no practical consequence could ever be founded, since, on this showing, it is impossible to affirm of any proposition, not being a contradiction in terms, that it is inconceivable. Antipodes were really, not fictitiously, inconceivable to our ancestors: they are indeed conceivable to us; and as the limits of our power of conception have been so largely extended, by the extension of our experience and the more varied exercise of our imagination, so may posterity find many combinations perfectly conceivable to them which are inconceivable to us. But, as beings of limited experience, we must always and necessarily have limited conceptive powers; while it does not by any means follow that the same limitation obtains in the possibilities of nature, nor even in her actual manifestations.

Rather more than a century and a half ago it was a [u]scientific[u] maxim, disputed by no one, and which no one deemed to require any proof, that "a thing cannot act where it is not."* With this weapon the Cartesians waged a formidable war against the theory of gravitation, which, according to them, involving so obvious an absurdity, must be rejected *in limine*: the sun could not possibly act upon the earth, not being there. It was not surprising that the adherents of the old systems of astronomy should urge this objection against the new; but the false assumption imposed equally on Newton himself, who in order to turn the edge of the objection, imagined a subtle ether which filled up the space between the sun and the earth, and by its intermediate

*[72] It seems that this doctrine was, before the time I have mentioned, disputed by some thinkers. Dr. Ward mentions Scotus, Vasquez, Biel, Francis Lugo, and Valentia. ["Mr. Mill's Denial of Necessary Truth," p. 313n.]

[q-q]MS, 43 unsafe
[r-r]MS, 43, 46 men
[s-s]+43, 46, 51, 56, 62, 65, 68, 72
[t]MS, 43, 46 so fully
[u-u]MS, 43, 46 philosophical

agency was the proximate cause of the phenomena of gravitation. "It is inconceivable," said Newton, in one of his letters to Dr. Bentley,*

that inanimate brute matter should, without the mediation of something else, which is not material, operate upon and affect other matter *without mutual contact*. . . . That gravity should be innate, inherent, and essential to matter, so that one body may act on another, at a distance, through a vacuum, without the mediation of anything else, by and through which their action and force may be conveyed from one to another, is to me so great an absurdity, that I believe no man, who in philosophical matters has a competent faculty of thinking, can ever fall into it.

This passage should be hung up in the cabinet of every [v]cultivator[v] of science who is ever tempted to pronounce a fact impossible because it appears to him inconceivable. In our own day one would be more [w]tempted[w], though with equal injustice, to reverse the concluding observation, and consider the seeing any absurdity at all in a thing so simple and natural, to be what really marks the absence of "a competent faculty of thinking." No one now feels any difficulty in conceiving gravity to be, as much as any other property is, " [x] inherent, and essential to matter," nor finds the comprehension of it facilitated in the smallest degree by the supposition of an ether [y](though some recent inquirers do give this as an explanation of it)[y]; nor thinks it at all incredible that the celestial bodies can and do act where they, in actual bodily presence, are not. To us it is not more wonderful that bodies should act upon one another "without mutual contact," than that they should do so when in contact; we are familiar with both [z]these facts[z], and we find them equally inexplicable, but equally easy to believe. To Newton, the one, because his imagination was familiar with it, appeared natural and a matter of course, while the other, for the contrary reason, seemed too absurd to be credited. [a]

It is strange that any one, after such a warning, should rely implicitly on the evidence *à priori* of such propositions as these, that matter cannot think; that space, or extension, is infinite; that nothing can be made out of nothing

*I quote this passage from Playfair's celebrated *Dissertation on the Progress of Mathematical and Physical Science* [*Supplement to the Fourth, Fifth, and Sixth Editions of the Encyclopædia Britannica*. Edinburgh: Constable, 1824, Vol. IV, p. 83n; *JSM's italics*. Playfair is quoting Newton's "Letter III to Dr. Bentley," in *Opera*. Ed. Samuel Horsley. 5 vols. London: Nichols, 1779–85, Vol. IV, p. 438.]

[v-v]MS, 43, 46 man
[w-w]MS, 43, 46, 51, 56 inclined
[x]MS, 43, 46 innate,
[y-y]+68, 72
[z-z]+43, 46, 51, 56, 62, 65, 68, 72
[a]MS, 43 If a Newton could err thus grossly in the use of such an argument, who else can trust himself with it?] 46 If Newton . . . *as* MS

(*ex nihilo nihil fit*). Whether these propositions are true or [b]not[b] this is not the place to determine, nor even whether the questions are soluble by the human faculties. But such doctrines are no more self-evident truths, than the ancient maxim that a thing cannot act where it is not, which probably is not now believed by any educated person in Europe.* Matter cannot think; why? because we *cannot conceive* thought to be annexed to any arrangement of material particles. Space is infinite, because having never known any part of it which had not other parts beyond it, we *cannot conceive* an absolute termination. *Ex nihilo nihil fit*, because having never known any physical product without a pre-existing physical material, we *cannot*, or think we cannot, *imagine* a creation out of nothing. But these things may in themselves be as conceivable as gravitation without [c]an intervening medium[c], which Newton thought too great an absurdity for any [d]person[d] of a competent faculty of philosophical thinking to admit: and even supposing them not conceivable, this, for aught we know, may be merely one of the limitations of our very limited minds, and not in nature at all. [e]

No [f]writer[f] has more directly identified himself with the fallacy now under consideration, or has embodied it in more distinct terms, than Leibnitz. In his view, unless a thing was not merely conceivable, but even explainable, it could not exist in nature. All *natural* phenomena, according to him, must be susceptible of being accounted for *à priori*. The only facts of which no explanation could be given but the will of God, were miracles properly so

*[65] This statement I must now correct, as too unqualified. The maxim in question was maintained with full conviction by no less an authority than Sir William Hamilton. See my *Examination*, Chap. xxiv.

[b-b]MS, 43, 46 no
[c-c]MS a subtle ether
[d-d]MS, 43, 46 man
[e]MS [*paragraph*] Coleridge has attempted, [see, e.g., *Biographia Literaria*. London: Rest Fenner, 1817, Vol. I, p. 133,] with his usual ingenuity, to establish a distinction which would save the credit of the common mode of thinking on this subject, declaring that the *unimaginable*, indeed, may possibly be true, but that the *inconceivable* cannot: and he would probably have said that the three supposed impossibilities last spoken of are not cases of mere unimaginableness, but of actual inconceivableness; while the action of the sun upon the earth without an intervening medium, was merely unimaginable. I am not aware that Coleridge has anywhere attempted to define the distinction between the two; and I am persuaded that, if he had, it would have broken down under him. But if by unimaginableness he meant, as seems likely, mere inability on our part to represent the phenomenon, like a picture of something visible, to the internal eye, the Antipodes were not unimaginable. They were capable of being imaged; capable of being drawn, or modelled in plaster. They were, however, inconceivable: the imagination could paint, but the intellect could not recognise them as a believable thing. Things may be inconceivable, then, without being incredible: and Coleridge's distinction, whether it have any foundation or not, will in no way help the maxim out.]
43 *as* MS . . . eye, antipodes were . . . *as* MS . . . imaged; capable even of . . . *as* MS]
46, 51 Coleridge has indeed attempted to establish . . . *as* 43
[f-f]MS, 43, 46 philosopher

called. "Je reconnais," says he,* "qu'il n'est pas permis de nier ce qu'on n'entend pas; mais j'ajoute qu'on a droit de nier (au moins dans l'ordre naturel) ce que absolument n'est point intelligible ni explicable. Je soutiens aussi . . . qu'enfin la conception des créatures n'est pas la mesure du pouvoir de Dieu, mais que leur conceptivité, ou force de concevoir, est la mesure du pouvoir de la nature, tout ce qui est conforme à l'ordre naturel pouvant être conçu ou entendu par quelque créature."

Not content with assuming that nothing can be true which we are unable to conceive, [g]scientific inquirers[g] have frequently given a still further extension to the doctrine, and [h]held[h] that, even of things not altogether inconceivable, that which we can conceive with the greatest ease is likeliest to be true. It was long an admitted axiom, and is not yet entirely discredited, that "nature always acts by the simplest means," *i.e.* by those which are most easily conceivable.† A large proportion of all the errors ever committed in the investigation of the laws of nature, have arisen from the assumption that the most familiar explanation or hypothesis must be the truest. One of the most instructive facts in scientific history is the pertinacity with which the human mind clung to the belief that the heavenly bodies must move in circles, or be carried round by the revolution of spheres; merely because those were in themselves the simplest suppositions: though, to make them accord with the facts which were ever contradicting them more and more, it became necessary to add sphere to sphere and circle to circle, until the original simplicity was converted into almost inextricable complication.

§ 4. [*Natural prejudice, of ascribing objective existence to abstractions*] We pass to another *à priori* fallacy or natural prejudice, allied to the former, and originating as that does, in the tendency to presume an exact correspondence between the laws of the mind and those of things external to it. The fallacy may be enunciated in this general form—Whatever can be thought of apart exists apart: and its most remarkable manifestation consists in the personification of abstractions. Mankind in all ages have had a strong propensity to conclude that wherever there is a name, there must be a distinguishable separate entity corresponding to the name; and every complex idea which the mind has formed for itself by operating upon its conceptions of individual things, was considered to have an outward objective reality

**Nouveaux Essais sur l'Entendement Humain—Avant-propos.* (*Œuvres*, Paris ed. 1842, Vol. I, p. 19.) [Ed. A. Jacques. 2 vols. Paris: Charpentier, 1846, Vol. I, p. 79.]

†[65] This doctrine also was accepted as true, and conclusions were grounded on it, by Sir William Hamilton. See *Examination*, Chap. xxiv.

[g-g]MS, 43, 46 philosophers
[h-h]MS, 43, 46 contended

answering to it. Fate, Chance, Nature, Time, Space, were real beings, nay, even gods. If the analysis of qualities in the earlier part of this work be correct, names of qualities and names of substances stand for the very same sets of facts or phenomena; *whiteness* and *a white thing* are only different phrases, required by convenience for speaking [a]of the same external fact under different relations[a]. Not such, however, was the notion which this verbal distinction suggested of old, either to the vulgar or to [b]the scientific[b]. Whiteness was an entity, inhering or sticking in the white substance: and so of all other qualities. So far was this carried, that even concrete general terms were supposed to be, not names of indefinite numbers of individual substances, but names of a peculiar kind of entities termed Universal Substances. Because we can think and speak of man in general, that is, of all [c]persons[c] in so far as possessing the common attributes of the species, without fastening our thoughts permanently on some one individual [d]person[d]; therefore man in general was supposed to be, not an aggregate of individual [e]persons[e], but an abstract or universal man, distinct from these.

It may be imagined what havoc metaphysicians trained in these habits made with philosophy, when they came to the largest generalizations of all. *Substantiæ Secundæ* of any kind were bad enough, but such Substantiæ Secundæ as τὸ ὄν, for example, and τὸ ἕν, standing for peculiar entities supposed to be inherent in all things which *exist*, or [f]in all[f] which are said to be *one*, were enough to put an end to all intelligible discussion; especially since, with a just perception that the truths which philosophy pursues are *general* truths, it was soon laid down that these general substances were the only [g]subjects[g] of science, being immutable, while individual substances cognizable by the senses, being in a perpetual flux, could not be the subject of real knowledge. This misapprehension of the [h]import[h] of general language constitutes Mysticism, a word so much oftener written and spoken than understood. Whether in the Vedas, in the Platonists, or in the Hegelians, mysticism is neither more nor less than ascribing objective existence to the subjective creations of [i]our own faculties, to ideas or feelings of the mind[i]; and believing that by watching and contemplating these ideas of its own making, it can read in them what takes place in the world without.

§ 5. [*Fallacy of the Sufficient Reason*] Proceeding with the enumeration of *à priori* fallacies, and endeavouring to arrange them with as much reference as possible to their natural affinities, we come to another, which is also

[a-a]MS, 43, 46, 51, 56, 62 , under different circumstances, of the same external fact
[b-b]MS, 43, 46 philosophers
[c-c]MS, 43, 46 men
[d-d]MS, 43, 46 man
[e-e]MS, 43, 46 men
[f-f]+72
[g-g]MS, 43 objects
[h-h]MS meaning
[i-i]MS, 43, 46 the mind's own faculties, to mere ideas of the intellect

nearly allied to the fallacy preceding the last, standing in the same relation to one variety of it as the fallacy last mentioned does to the other. This, too, represents nature as [a]under incapacities corresponding to those[a] of our intellect; but instead of only asserting that nature cannot do a thing because we cannot conceive it done, goes the still greater length of averring that nature does a particular thing, on the sole ground that we can see no reason why she should not. Absurd as this seems when so plainly stated, it is a received principle among [b]scientific authorities[b] for demonstrating *à priori* the laws of physical phenomena. A phenomenon must follow a certain law, because we see no reason why it should deviate from that law in one way rather than in another. This is called the Principle of the Sufficient Reason;* and by means of it philosophers often flatter themselves that they are able to establish, without any appeal to experience, the most general truths of experimental physics.

Take, for example, two of the most elementary of all laws, the law of inertia and the first law of motion. A body at rest cannot, it is affirmed, begin to move unless acted upon by some external force: because, if it did, it must either move up or down, forward or backward, and so forth; but if no outward force acts upon it, there can be *no reason* for its moving up rather than down, or down rather than up, &c., *ergo*, it will not move at all. [c]

This reasoning I conceive to be entirely fallacious, as indeed Dr. [d] Brown, in his treatise on Cause and Effect,[*] has shown with great acuteness and justness of thought. We have before remarked, that almost every fallacy may be referred to different genera by different modes of filling up the suppressed steps; and this particular one may, at our option, be brought under *petitio principii*. It supposes that nothing can be a "sufficient reason" for a body's moving in one particular direction, except some external force. But this is the very thing to be proved. Why not some [e]*internal*[e] force? Why not the law of the thing's own nature? Since these philosophers think it necessary to prove the law of inertia, they of course do not suppose *it* to be self-evident; they must, therefore, be of opinion that, previously to all proof, the supposition of a body's moving by internal impulse is an admissible hypothesis; but if so, why is not the hypothesis also admissible, that the internal impulse acts naturally in some one particular direction, not in another? If spontaneous

*[56] Not that of Leibnitz, but the principle commonly appealed to under that name by mathematicians.

[*Thomas Brown, *Inquiry into the Relation of Cause and Effect*, Part III, §4, pp. 232ff.]

[a-a]MS, 43, 46 bound to conform herself to the incapacities
[b-b]MS, 43, 46 philosophers] 51, 56, 62, 65 the scientific
[c]MS, 43 Q.E.D.
[d]MS Thomas
[e-e]MS *in*ternal

motion might have been the law of matter, why not spontaneous motion towards the sun, towards the earth, or towards the zenith? Why not, as the ancients supposed, towards a particular place in the universe, appropriated to each particular kind of substance? Surely it is not allowable to say that spontaneity of motion is credible in itself, but not credible if supposed to take place in any determinate direction.

Indeed, if any one chose to assert that all bodies when uncontrolled set out in a direct line towards the north pole, he might equally prove his point by the principle of the Sufficient Reason. By what right is it assumed that a state of rest is the particular state which cannot be deviated from without special cause? Why not a state of motion, and of some particular sort of motion? Why may we not say that the natural state of a horse left to himself is to amble, because otherwise he must either trot, gallop, or stand still, and because we know no reason why he should do one of these rather than another? If this is to be called an unfair use of the "sufficient reason," and the other a fair one, there must be a tacit assumption that a state of rest is more natural to a horse than a state of ambling. If this means that it is the state which the animal will assume when left to himself, that is the very point to be proved; and if it does not mean this, it can only mean that a state of rest is the simplest state, and therefore the most likely to prevail in nature, which is one of the fallacies or natural prejudices we have already examined.

So again of the First Law of Motion; that a body once moving will, if left to itself, continue to move uniformly in a straight line. An attempt is made to prove this law by saying, that if not, the body must deviate either to the right or to the left, and that there is no reason why it should do one more than the other. But who could know, antecedently to experience, whether there was a reason or not? Might it not be the nature of bodies, or of some particular bodies, to deviate towards the right? or if the supposition is preferred, towards the east, or south? It was long thought that bodies, terrestrial ones at least, had a natural tendency to deflect downwards; and there is no shadow of anything objectionable in the supposition, except that it is not true. The pretended proof of the law of motion is even more manifestly untenable than that of the law of inertia, for it is flagrantly inconsistent; it assumes that the continuance of motion in the direction first taken is more natural than deviation either to the right or to the left, but denies that one of these can possibly be more natural than the other. All these fancies of the possibility of knowing what is natural or not natural by any other means than experience, are, in truth, entirely futile. The real and only proof of the laws of motion, or of any other law of the universe, is experience; it is simply that no other suppositions explain or are consistent with the facts of universal nature.

Geometers have, in all ages, been open to the imputation of endeavouring to prove the most general facts of the outward world by sophistical reasoning,

in order to avoid appeals to the senses. Archimedes, says Professor Playfair,* established some of the elementary propositions of statics by a process in which he "borrows no principle from experiment, but establishes his conclusion entirely by reasoning *à priori*. He assumes, indeed, that equal bodies, at the ends of the equal arms of a lever, will balance one another; and also that a cylinder or parallelopiped of homogeneous matter, will be balanced about its centre of magnitude. These, however, are not inferences from experience; they are, properly speaking, conclusions deduced from the principle of the Sufficient Reason." And to this day there are few geometers who would not think it far more scientific to establish these or any other premises in this way, than to rest their evidence on that familiar experience which in the case in question might have been so safely appealed to.

§ 6. [*Natural prejudice, that the differences in nature correspond to the distinctions in language*] Another natural prejudice, of most extensive prevalence, and which [a]had a great share in producing the errors fallen into by the ancients[a] in their physical inquiries, was this: That the differences in nature must correspond to our received distinctions; that effects which we are accustomed, in popular language, to call by different names, and arrange in different classes, must be of different natures, and have different causes. This prejudice, so evidently of the same origin with those already treated of, marks more especially the earliest stage of science, when it has not yet broken loose from the trammels of every-day phraseology. The extraordinary prevalence of the fallacy among the Greek philosophers may be accounted for by their generally knowing no other language than their own; from which it was a consequence that their ideas followed the accidental or arbitrary combinations of that language, more completely than can happen among the moderns to any but illiterate persons. They had great difficulty in distinguishing between things which their language confounded, or in putting mentally together things which it distinguished; and could hardly combine the objects in nature, into any classes but those which were made for them by the popular phrases of their own country: or at least could not help fancying those classes to be natural, and all others arbitrary and artificial. Accordingly, [b] scientific investigation among the Greek [c]schools of speculation[c] and their followers in the middle ages, was little more than a mere sifting and analysing of the notions attached to common language. They thought that by determining the meaning of words, they could become acquainted with facts.

**Dissertation*, ut supra, [Vol. II,] p. 27.

[a-a]MS, 43, 46 lay at the root of the errors fallen into by the ancient philosophers
[b]MS, 43 as is remarked by Mr. Whewell,
[c-c]MS, 43, 46 philosophers

"They took for granted," says Dr. Whewell,* "that philosophy must result from the relations of those notions which are involved in the common use of language, and they proceeded to seek it by studying such notions." In his next chapter, Dr. Whewell has so well illustrated and exemplified this error, that [d]I[d] shall take the liberty of quoting him at some length.

The propensity [e] to seek for principles in the common usages of language may be discerned at a very early period. Thus we have an example of it in a saying which is reported of Thales, the founder of Greek philosophy. When he was asked, 'What is the *greatest* thing?' he replied '*Place*; for all other things are *in* the world, but the world is *in* it.' In Aristotle we have the consummation of this mode of speculation. The usual point from which he starts in his inquiries is, that *we say* thus or thus in common language. Thus, when he has to discuss the question whether there be, in any part of the universe, a void, or space in which there is nothing, he inquires first in how many senses we say that one thing is *in* another. He enumerates many of these; we say the part is in the whole, as the finger is *in* the hand; again we say, the species is in the genus, as man is included *in* animal; again, the government of Greece is *in* the king; and various other senses are described and exemplified, but of all these *the most proper* is when we say a thing is *in* a vessel, and generally *in place*. He next examines what *place* is, and comes to this conclusion, that 'if about a body there be another body including it, it is in place, and if not, not.' A body moves when it changes its place; but he adds, that if water be in a vessel, the vessel being at rest, the parts of the water may still move, for they are included by each other; so that while the whole does not change its place, the parts may change their place in a circular order. Proceeding then to the question of a *void*, he as usual examines the different senses in which the term is used, and adopts as the most proper, *place without matter*: with no useful result.

Again, in a question concerning mechanical action, he says, 'When a man moves a stone by pushing it with a stick, *we say* both that the man moves the stone, and that the stick moves the stone, but the latter *more properly*.'

Again, we find the Greek philosophers applying themselves to extract their dogmas from the most general and abstract notions which they could detect; for example, from the conception of the Universe as One or as Many things. They tried to determine how far we may, or must, combine with these conceptions that of a whole, of parts, of number, of limits, of place, of beginning or end, of full or void, of rest or motion, of cause and effect, and the like. The analysis of such conceptions with such a view, occupies, for instance, almost the whole of Aristotle's *Treatise on the Heavens*.[*]

**History of the Inductive Sciences*, Bk. I, Chap. i [1st ed., Vol. I, pp. 35–6; 3rd ed., Vol. I, p. 28.]

[**Ibid.*, pp. 37–9; 3rd ed., pp. 29–30. For Aristotle's *Treatise on the Heavens*, see *De Coelo*. Ed. W. K. C. Guthrie. London: Heinemann, 1939. The reference in the first paragraph is to Aristotle's *Physics*, Vol. I, pp. 292ff. (Bk. IV, Chap. iii); that in the second to *ibid.*, Vol. II, pp. 318ff. (Bk. VIII, Chap. v). The quotation from Thales derives from Plutarch; see *Septem Sapientium Convivium*, in *Moralia*, Vol. II. Ed. Frank Cole Babbitt. London: Heinemann, 1928, p. 388 (153c).]

[d-d]MS, 43 we
[e]MS, 43 ," says he, "

The following paragraph merits particular attention:

Another mode of reasoning, very widely applied in these attempts, was the *doctrine of contrarieties*, in which it was assumed that adjectives or substantives which are in common language, or in some abstract mode of conception, opposed to each other, must point at some fundamental antithesis in nature, which it is important to study. Thus Aristotle says that the Pythagoreans, from the contrasts which number suggests, collected ten principles—Limited and Unlimited, Odd and Even, One and Many, Right and Left, Male and Female, Rest and Motion, Straight and Curved, Light and Darkness, Good and Evil, Square and Oblong . . . . Aristotle himself deduced the doctrine of four elements and other dogmas by oppositions of the same kind.[*]

Of the manner in which, from premises obtained in this way, the ancients attempted to deduce laws of nature, [f]an example is given in the same work[f] a few pages further on.

Aristotle decides that there is no void on such arguments as this. In a void there could be no difference of up and down; for as in nothing there are no differences, so there are none in a privation or negation; but a void is merely a privation or negation of matter; therefore, in a void, bodies could not move up and down, which it is in their nature to do. It is easily seen [Dr. Whewell very justly adds] that such a mode of reasoning elevates the familiar forms of language, and the intellectual connexions of terms, to a supremacy over facts; making truth depend upon whether terms are or are not privative, and whether we say that bodies fall *naturally*.[†]

The propensity to assume that the same relations obtain between objects themselves, which obtain between our ideas of them, is here seen in the extreme stage of its development. For the mode of philosophizing, exemplified in the foregoing instances, assumes no less than that the proper way of arriving at knowledge of nature, is to study nature [g]itself[g] subjectively; to apply our observation and analysis not to the facts, but to the common notions entertained of [h]the[h] facts.

Many other equally striking examples may be given of the tendency to assume that things which for the convenience of common life are placed in different classes, must differ in every respect. Of this nature was the universal and deeply-rooted prejudice of antiquity and the middle ages, that celestial and terrestrial phenomena must be essentially different, and could in no manner or degree depend on the same laws. Of the same kind, also, was the

[*Ibid., p. 40; 3rd ed., p. 31; Aristotle, *Metaphysics*, Vol. I, pp. 30ff. (Bk. I, Chap. v).]

[†Ibid., p. 44; 3rd ed., p. 34; Aristotle, *Physics*, Vol. I, pp. 336ff. (Bk. IV, Chap. vii).]

[f-f]MS, 43 one example is given by Mr. Whewell
[g-g]MS, 43, 46, 51, 56, 62, 65 herself
[h-h]MS, 43, 46, 51, 56, 62, 65 those

prejudice against which Bacon contended, that nothing produced by nature could be successfully imitated by man: "Calorem solis et ignis toto genere differre; ne scilicet homines putent se per opera ignis, aliquid simile iis quæ in Natura fiunt, educere et formare posse:" and again, "Compositionem tantum opus Hominis, Mistionem vero opus solius Naturæ esse: ne scilicet homines sperent aliquam ex arte Corporum naturalium generationem aut transformationem."* The grand distinction in the ancient [i]scientific speculations[i], between natural and violent motions, though not without a plausible foundation in the appearances themselves, was doubtless greatly recommended to adoption by its conformity to this prejudice.

§ 7. [*Prejudice, that a phenomenon cannot have more than one cause*] From the fundamental error of the scientific inquirers of antiquity, we pass, by a natural association, to a scarcely less fundamental one of their great rival and successor, Bacon. It has excited the surprise of philosophers that the detailed system of inductive logic, which this extraordinary man laboured to construct, has been turned to so little direct use by subsequent inquirers, having neither continued, except in a few of its generalities, to be recognised as a theory, nor [a]having[a] conducted in practice to any great scientific results. But this, though not unfrequently remarked, has scarcely received any plausible explanation; and some, indeed, have preferred to assert that all rules of induction are useless, rather than [b] suppose that Bacon's rules are grounded on an insufficient analysis of the inductive process. Such, however, will be seen to be the fact, as soon as it is considered, that Bacon entirely overlooked [c] Plurality of Causes. All his rules tacitly imply the assumption, so contrary to all we now know of nature, that a phenomenon cannot have more than one cause.

When [d]he[d] is inquiring into what he terms the *forma calidi aut frigidi, gravis aut levis, sicci aut humidi*, and the like,[*] he never for an instant doubts that there is some one thing, some invariable condition or set of conditions, which is present in all cases of heat, or [e]cold, or[e] whatever other phenomenon he is considering; the only difficulty being to find what it is; which accordingly he tries to do by a process of elimination, rejecting or excluding, by negative instances, whatever is not the *forma* or cause, in order to arrive at what is. But, that this *forma* or cause is *one* thing, and that it is the same in all hot objects, he has no more doubt of, than another person has that there is always some cause *or other*. In the present state of knowledge it

**Novum Organum*, [Bk. I,] Aph. 75 [p. 184].
[*See *ibid.*, pp. 228ff.; *De Augmentis*, p. 566.]

[i-i]MS, 43, 46 philosophy
[a-a]+43, 46, 51, 56, 62, 65, 68, 72
[b]MS to
[c]MS the
[d-d]MS, 43 Bacon
[e-e]MS, 43, 46 of cold, or of

could not be necessary, even if we had not already treated so fully of the question, to point out how widely this supposition is at variance with the truth. It is particularly unfortunate for Bacon that, falling into this error, he should have fixed almost exclusively upon a class of inquiries in which it was [f]especially[f] fatal; namely, inquiries into the causes of the sensible qualities of objects. For his assumption, groundless in every case, is false in a peculiar degree with respect to those sensible qualities. In regard to scarcely any of them has it been found possible to trace any unity of cause, any set of conditions invariably accompanying the quality. The conjunctions of such qualities with one another constitute the variety of Kinds, in which, as already remarked, it has not been found possible to trace any law. [g]Bacon[g] was seeking for what did not exist. The phenomenon of which he sought for the one cause has oftenest no cause at all, and when it has, depends (as far as hitherto ascertained) on an unassignable variety of distinct causes.

And on this rock every one must split, who [h] represents to himself as the first and fundamental problem of science to ascertain what is the cause of a given effect, rather than what are the effects of a given cause. It was shown, in an early stage of our inquiry into the nature of Induction,* how much more ample are the resources which science commands for the latter than for the former inquiry, since it is upon the latter only that we can throw any direct light by means of experiment; the power of artificially producing an effect, implying a previous knowledge of at least one of its causes. If we discover the causes of effects, it is generally by having previously discovered the effects of causes: the greatest skill in devising crucial instances for the former purpose may only end, as Bacon's physical inquiries did, in no result at all. Was it that his eagerness to acquire the power of producing for man's benefit effects of practical importance to human life, rendering him impatient of pursuing that end by a circuitous route, made even him, the champion of experiment, prefer the direct mode, though one of mere observation, to the indirect [i], in which alone experiment was possible? Or had even Bacon not entirely cleared his mind from the notion of the ancients, that "rerum cognoscere *causas*" was the sole object of philosophy, and that to inquire into the *effects* of things belonged to servile and mechanical arts?

It is worth remarking that, while the only efficient mode of cultivating speculative science was missed from an undue contempt of manual operations, the false speculative views thus engendered gave in their turn a false direction to such practical and mechanical aims as were [j] suffered to exist. The assumption universal among the ancients and in the middle ages, that

*Supra, Bk. III, Chap. vii, §4 [pp. 384–7].

[f-f]MS peculiarly] 43, 46 particularly [*printer's error?*]
[g-g]46 The philosopher
[h]MS, 43 , like Bacon,
[i]MS one
[j]MS, 43, 46 still

there were *principles* of heat and cold, dryness and moisture, &c., led directly to a belief in alchemy; in a transmutation of substances, a change from one Kind into another. Why should it not be possible to make gold? Each of the characteristic properties of gold [k]has[k] its *forma*, its essence, its set of conditions, which if we could discover, and learn how to [l]realize[l], we could superinduce that particular property upon any other substance, upon wood, or iron, or lime, or clay. If, then, we could effect this with respect to every one of the essential properties of the precious metal, we should have converted the other substance into gold. Nor did this, if once the premises were granted, appear to transcend the real powers of [m]mankind[m]. For daily experience showed that almost every one of the distinctive sensible properties of any object, its consistence, its colour, its taste, its smell, its shape, admitted of being totally changed by fire, or water, or some other chemical agent. The *formæ* of all those qualities seeming, therefore, to be within human power either to produce or to annihilate, not only did the transmutation of substances appear abstractedly possible, but the employment of the power, at our choice, for practical ends, seemed by no means hopeless.*

A prejudice, universal in the ancient world, and from which [n] Bacon was so far from being free, that it pervaded and vitiated the whole practical part of his system of logic, may with good reason be ranked high in the order of Fallacies of which we are now treating.

§ 8. [*Prejudice, that the conditions of a phenomenon must resemble the phenomenon*] There remains one *à priori* fallacy or natural prejudice, the most deeply-rooted, perhaps, of all which we have enumerated: one which not only reigned supreme in the ancient world, but still possesses almost undisputed dominion over many of the most cultivated minds; and [a]some of the most remarkable of the numerous instances by which I shall think it necessary to exemplify it,[a] will be taken from [b]recent thinkers[b]. This is, that the conditions of a phenomenon must, or at least probably will, resemble the phenomenon itself.

Conformably to what we have before remarked to be of [c] frequent occurrence, this fallacy might without much impropriety have been placed in a different class, among Fallacies of [d] Generalization: for experience does

*[51] It is hardly needful to remark that nothing is here intended to be said against the possibility at some future period of making gold,—by first discovering it to be a compound, and putting together its different elements or ingredients. But this is a totally different idea from that of the seekers of the grand arcanum.

[k-k]MS, 43, 46, 51 had
[l-l]MS produce
[m-m]MS, 43, 46 man
[n]MS, 43, 46 even
[a-a]MS of the numerous instances . . . it, some of the most remarkable
[b-b]MS, 43, 46 the writings of recent philosophers
[c]MS so
[d]MS Bad

afford a certain degree of countenance to the assumption. The cause does, in very many cases, resemble its effect; like produces like. Many phenomena have a direct tendency to perpetuate their own existence, or to give rise to other phenomena similar to themselves. Not to mention forms actually moulded on one another, as impressions on wax and the like, in which the closest resemblance between the effect and its cause is the very law of the phenomenon; all motion tends to continue itself, with its own velocity, and in its own original direction; and the motion of one body tends to set others in motion, which is indeed the most common of the modes in which the motions of bodies originate. We need scarcely refer to contagion, fermentation, and the like; or to the production of effects by the growth or expansion of a germ or rudiment resembling on a smaller scale the completed phenomenon, as in the growth of a plant or animal from an embryo, that embryo itself deriving its origin from another plant or animal of the same kind. Again, [e]the[e] thoughts, or reminiscences, which are effects of our past sensations, resemble those sensations; feelings produce similar feelings by way of sympathy; acts produce similar acts by involuntary or voluntary imitation. With so many appearances in its favour, no wonder if a presumption naturally grew up[f], that causes must *necessarily* resemble their effects, and that like could *only* be produced by like.

This principle of fallacy has usually presided over the fantastical attempts to influence the course of nature by conjectural means, the choice of which was not directed by previous observation and experiment. The guess almost always fixed upon some means which possessed features of real or apparent resemblance to the end in view. If a charm was wanted, as by Ovid's Medea, to prolong life, all long-lived animals, or what were esteemed such, were collected and brewed into a broth:

> . . . nec defuit illic
> Squamea Cinyphii tenuis membrana chelydri
> Vivacisque jecur cervi: quibus insuper addit
> Ora caputque novem cornicis sæcula passæ.[*]

A similar notion was embodied in the celebrated medical theory called the "Doctrine of Signatures," "which is no less," says Dr. Paris,* "than a belief that every natural substance which possesses any medicinal virtue indicates by an obvious and well-marked external character the disease for which it is a remedy, or the object for which it should be employed." This

[**Metamorphoses*. Ed. F. J. Miller. 2 vols. London: Heinemann, 1916, Vol. I, p. 360 (Bk. VII, ll. 271–4.]

**Pharmacologia*, p. 43.

[e-e]MS our
[f]MS, 43, 46 in men's minds

outward character was generally some feature of resemblance, real or fantastical, [g]either[g] to the effect it was supposed to produce, or to the phenomenon over which its power was thought to be exercised.

Thus the lungs of a fox must be a specific for asthma, because that animal is remarkable for its strong powers of respiration. Turmeric has a brilliant yellow colour, which indicates that it has the power of curing the jaundice; for the same reason, poppies must relieve diseases of the head; Agaricus those of the bladder; *Cassia fistula* the affections of the intestines, and Aristolochia the disorders of the uterus: the polished surface and stony hardness which so eminently characterize the seeds of the Lithospermum officinale (common gromwell) were deemed a certain indication of their efficacy in calculous and gravelly disorders; for a similar reason, the roots of the Saxifraga granulata (white saxifrage) gained reputation in the cure of the same disease; and the Euphrasia (eye-bright) acquired fame, as an application in complaints of the eye, because it exhibits a black spot in its corolla resembling the pupil. The blood-stone, the Heliotropium of the ancients, from the occasional small specks or points of a blood-red colour exhibited on its green surface, is even at this [h]very[h] day employed in many parts of England and Scotland, to stop a bleeding from the nose; and nettle tea continues a popular remedy for the cure of *Urticaria*. It is also asserted that some substances bear the *signatures* of the humours, as the petals of the red rose that of the blood, and the roots of rhubarb and the flowers of saffron that of the bile.[*]

The early speculations respecting the [i]chemical[i] composition of bodies were rendered abortive by no circumstance more, than by their invariably taking for granted that the properties of the elements must resemble those of the compounds which were formed from them.

To descend to more modern instances; it was long thought, and was stoutly maintained by the Cartesians and even by Leibnitz[†] against the Newtonian [j]system[j], (nor did Newton himself, as we have seen, contest the assumption, but eluded it by an arbitrary hypothesis), that nothing (of a physical nature at least) could account for motion, except previous motion; the impulse or impact of some other body. It was very long before the scientific world could prevail upon itself to admit attraction and repulsion (*i.e.* spontaneous tendencies of particles to approach or recede from one another) as ultimate laws, no more requiring to be accounted for than impulse itself, if indeed the latter were not, in truth, resolvable into the former. From [k]the[k] same source arose the innumerable hypotheses [l]devised[l] to explain those classes of [m]motion[m] which appeared more mysterious than others

[*]*Ibid.*, pp. 44–5.]
[†See *Esprit de Leibnitz, ou Recueil de pensées choisies*. Lyons: Bruyset, 1772, Vol. II, p. 508.]

[g-g]+43, 46, 51, 56, 62, 65, 68, 72
[h-h]+68, 72 [Source *as* MS]
[i-i]+43, 46, 51, 56, 62, 65, 68, 72
[j-j]MS, 43, 46 philosophy
[k-k]MS, 43, 46 this
[l-l]+51, 56, 62, 65, 68, 72
[m-m]MS, 43, 46, 51, 56, 62, 65, 68 motions [*printer's error?*]

because there was no obvious mode of attributing them to impulse, as for example the voluntary motions of the human body. Such were the interminable systems of vibrations propagated along the nerves, or animal spirits rushing up and down between the muscles and the brain; which, if the facts could have been proved, would [n] have been an important addition to our knowledge of physiological laws; but the mere invention, or arbitrary supposition of them, could not unless by the strongest delusion be supposed to render the phenomena of animal life more comprehensible, or less mysterious. Nothing [o], however, seemed satisfactory[o], but to make out that motion was caused by motion; by something like itself. If it was not one kind of motion, it must be another. In like manner it was supposed that the physical qualities of objects must arise from some similar quality, or perhaps only [p]some quality[p] bearing the same name, in the particles or atoms of which the objects were composed; that a sharp taste, for example, must arise from sharp particles. And reversing the inference, the effects produced by a phenomenon must, it was supposed, resemble in their physical attributes the phenomenon itself. The influences of the planets were supposed to be analogous to their visible peculiarities: Mars, being of a red colour, portended fire and slaughter; and the like.

Passing from physics to metaphysics, we may notice among the most remarkable fruits of this *à priori* fallacy, two closely analogous theories, employed in ancient and [q] modern times to bridge over the chasm between the world of mind and that of matter: the *species sensibiles* of the Epicureans, and the modern doctrine of perception by means of ideas. These theories are indeed, probably, indebted for their existence not solely to the fallacy in question, but to that fallacy combined with another natural prejudice already adverted to, that a thing cannot act where it is not. In both doctrines it is assumed that the phenomenon which takes place *in us* when we see or touch an object, and which we regard as an effect of that object, or rather of its presence to our organs, must of necessity resemble very closely the outward object itself. To fulfil this condition, the Epicureans supposed that objects were constantly projecting in all directions impalpable images of themselves, which entered at the eyes and penetrated to the mind; while modern [r]metaphysicians[r], though they rejected this hypothesis, agreed in deeming it necessary to suppose that not the [s]thing[s] itself, but a mental image or representation of it, was the direct object of perception. Dr. Reid had to employ a world of argument and illustration to familiarize people with the truth, that the sensations or impressions on our minds need not necessarily be copies of, or [t]bear[t]

[n]MS, 43, 46 no doubt
[o-o]MS would do, however
[p-p]MS from one
[q]MS, 43, 46 in
[r-r]MS, 43, 46 philosophers
[s-s]MS, 43, 46 object
[t-t]43, 46 have [*printer's error?*]

any resemblance to, the causes which produce them; in opposition to the natural prejudice which led [u]people[u] to assimilate the action of bodies upon our senses, and through them upon our minds, to the transfer of a given form from one object to another by actual moulding.[*] The works of Dr. Reid are even now the most effectual course of study for detaching the mind from the prejudice of which this was an example. And the value of the service which he thus rendered to popular philosophy, is not much diminished although we may hold, with Brown,[†] that he went too far in imputing the "ideal theory" as an actual tenet, to the generality of the philosophers who preceded him, and especially to Locke and Hume: for if they did not themselves consciously fall into the error, unquestionably they often led their readers into it.

The prejudice, that the conditions of a phenomenon must resemble the phenomenon, is occasionally exaggerated, at least verbally, into a still more palpable absurdity; the conditions of the thing are spoken of as if they *were* the very thing itself. In Bacon's model-inquiry, which occupies so great a space in the *Novum Organum*,[‡] the *inquisitio in formam calidi*, the conclusion which he favours is that heat is a kind of motion; meaning of course not the feeling of heat, but the conditions of the feeling; meaning, therefore, only that wherever there is heat, there must first be a particular kind of motion; but he makes no distinction in his language between these two ideas, [v]expressing[v] himself as if heat, and the conditions of heat, were one and the same thing. So [w]the elder[w] Darwin, in the beginning of his *Zoonomia*, says, "The word *idea* has various meanings in the writers of metaphysic: it is here used simply for those notions of external things which our organs of sense bring us acquainted with originally," (thus far the proposition, though vague, is unexceptionable in meaning,) "and is defined a contraction, a motion, or configuration, of the fibres which constitute the immediate organ of sense."[§] Our *notions*, a configuration of the fibres! What [x]kind of logician[x] must he be who thinks that a phenomenon is *defined* to *be* the [y]condition[y] on which he supposes it to depend? Accordingly he says soon after, not that our ideas are caused by, or consequent on, certain organic phenomena, but "our ideas

[*See *Essays on the Intellectual Powers of Man, Works*, Vol. I, pp. 253ff.]
[†See Thomas Brown, *Lectures on the Philosophy of the Human Mind*, Vol. II, pp. 1ff.]
[‡Pp. 236ff.]
[§Erasmus Darwin. *Zoonomia*. 3rd ed. 4 vols. London: Johnson, 1801, Vol. I, pp. 11–12.]

u-uMS, 43, 46 men
v-vMS but expresses
w-w+72
x-xMS a philosopher] 43 kind of philosopher
y-yMS conditions

are animal motions of the organs of sense."[*] And this confusion runs through the four volumes of the *Zoonomia*; the reader never knows whether the writer is speaking of the effect, or of its supposed cause; of the idea, a state of mental consciousness, or of the state of the nerves and [z]brain[z] which he considers it to presuppose.

I have given a variety of instances in which the natural prejudice, that causes and their effects must resemble one another, has operated in practice so as to give rise to [a]serious[a] errors. I shall now go [b]further[b], and produce from [c]writings even of the present or very recent times, instances in which this prejudice[c] is laid down as an established principle. M. Victor Cousin, in the last of his [d]celebrated[d] lectures on Locke [e], enunciates the[e] maxim in the following unqualified terms. "Tout ce qui est vrai de l'effet, est vrai de la cause."[†] A doctrine to which, unless in some peculiar and technical meaning of the words cause and effect, it is not to be imagined that any person would literally adhere: but he who could so write must be far enough from seeing, that the very reverse might be the [f]effect[f]; that there is nothing impossible in the supposition that no one property which is true of the effect might be true of the cause. Without going quite so far in point of expression, Coleridge, in his *Biographia Literaria*,* affirms as an "evident truth," that "the law of causality holds only between homogeneous things, *i.e.* things having some common property," and therefore "cannot extend from one world into another, its opposite:" hence, as mind and matter have no common property, mind cannot act upon matter, nor matter upon mind. What is this but the *à priori* fallacy of which we are speaking? The doctrine, like many others of Coleridge, is taken from Spinoza, in the first book of whose *Ethica* (*De Deo*) it stands as the Third Proposition, "Quæ res nihil commune inter se habent, earum una alterius causa esse non potest,"[‡] and is there proved from two so-called axioms, equally gratuitous with itself: but Spinoza, ever systematically consistent, pursued the doctrine to its inevitable consequence, the materiality of God.

[**Ibid.*, p. 28; JSM's italics.]
[†*Philosophie de Locke.* 4th ed. Paris: Didier, 1861, p. 395.]
*Vol. I, Chap. viii [p. 129].
[‡In *Opera.* Ed. C. H. Bruder. Leipzig: Tauchnitz, 1843, Vol. I, p. 189.]

z–zMS muscles
a–aMS, 43, 46 grievous
b–bMS farther [*printer's error?*]
c–cMS, 43, 46 the writings, even of recent philosophers, instances in which the prejudice itself
d–dMS, 43 very remarkable
e–eMS, 43, 46 (which as a *resumé* of the objections of the opposite school to that great man's doctrines, is a work of eminent merit,) enunciates this
f–fMS, 43, 46, 51, 56, 62, 65, 68 fact [*printer's error?*]

[g] The same conception of impossibility led the ingenious and subtle mind of Leibnitz to his celebrated doctrine of a pre-established harmony. He, too, thought that mind could not act upon matter, nor [h] matter upon mind, and that the two, therefore, must have been arranged by their Maker like two clocks, which, though unconnected with one another, strike simultaneously, and always point to the same hour. Malebranche's [i]equally famous[i] theory of Occasional Causes was [j]another form of the same[j] conception: instead of supposing the clocks originally arranged to strike together, he held that when the one strikes, God interposes, and makes the other strike in correspondence with it.

Descartes, in like manner, whose works are a rich mine of [k]almost[k] every description of *à priori* fallacy, says that the Efficient Cause must at least have all the perfections of the effect, and for this singular reason: "Si enim ponamus aliquid in ideâ reperiri quod non fuerit in ejus causâ, hoc igitur habet a nihilo;"[*] of which it is scarcely a parody to say, that if there be pepper in the soup there must be pepper in the cook who made it, since otherwise the pepper would be without a cause. A similar fallacy is committed by Cicero, in his second book *De Finibus*, where, speaking in his own person against the Epicureans, he charges them with inconsistency in saying that the pleasures of the mind had their origin from those of the body, and yet that the former were more valuable, as if the effect could surpass the cause. "Animi voluptas oritur propter voluptatem corporis, et major est animi voluptas quam corporis? ita fit ut gratulator, lætior sit quam is cui gratulatur."[†] Even that, surely, is [l]not an impossibility: a person's good fortune has often given more pleasure to others than it gave to the person[l] himself.

Descartes, with no less readiness, applies the same principle the converse way, and infers the nature of the effects from the assumption that they must, in this or that property or in all their properties, resemble their cause. To this class belong his speculations, and those of so many others after him, tending to infer the order of the universe, not from observation, but [m]by *à priori* reasoning from supposed[m] qualities of the Godhead. This sort of inference was probably never carried to a greater length than it was in one particular instance by Descartes, when, as a proof of one of his physical

[**Meditationes de prima philosophia.* Amsterdam: Elzevir, 1654, p. 19.]
[†Ed. H. Rackham. London: Heinemann, 1914, p. 200 (Bk. II, Chap. xxiii).]

[g]MS [*no paragraph*]
[h]MS, 43, 46, 51 especially
[i-i]MS celebrated
[j-j]MS, 43, 46, 51 a further refinement on this
[k-k]+43, 46, 51, 56, 62, 65, 68, 72
[l-l]MS, 43, 46 no absolute impossibility: a man's good fortune has been known to give more . . . to the man
[m-m]MS, 43, 46 from the notion we think ourselves able to form of the

principles, that the quantity of motion in the universe is invariable, he had recourse to the immutability [n]of the[n] Divine Nature. [o]Reasoning of a very similar character is however nearly as common now as it was in his time, and does duty largely as a means of fencing off disagreeable conclusions. Writers have not yet ceased to oppose the theory of divine benevolence to the evidence of physical facts, to the principle of population for example. And people seem in general to think that they have used a very powerful argument, when they have said, that to suppose some proposition true, would be a reflection on the [p]goodness or wisdom[p] of the Deity. Put into the simplest possible terms, their argument is, "If it had depended on me, I would not have made the proposition true, therefore it is not true." Put into other words it stands thus: "God is perfect, therefore (what I think) perfection must obtain in nature." But since in reality every one feels that nature is very far from perfect, the doctrine is never applied consistently. It [q]furnishes[q] an argument which (like many others of a similar character) people like to appeal to when it makes for their own side. Nobody is convinced by it, but each appears to think that it puts religion on his side of the question, and that it is a useful weapon of offence for wounding an adversary.[o]

Although several other varieties of *à priori* fallacy might probably be added to those here specified, these are all against which it seems necessary to give any special caution. Our object is to open, without attempting or affecting to exhaust, the subject. Having illustrated, therefore, this first class of Fallacies at sufficient length, I shall proceed to the second.

[n-n]51 of [*printer's error?*]

[o-o]MS, 43, 46 Optimism, in all its shapes, is an example of the same species of fallacy: God is perfect, therefore what we think perfection must obtain in nature. Even in our own time men do not cease to oppose the divine benevolence to the evidence of physical facts, to the principle of population for example. As if the subjection of mankind to physical suffering, often entirely unavoidable, and, when capable of being warded off, capable only by means of forethought and self-restraint, were more difficult to reconcile with the ways of Providence in some one of its particular manifestations than in so many others. As if, in so far as pain is an imperfection, any one day's experience were not sufficient to convince the devoutest mind that imperfection, in that sense, in the work, entered into the plans of the Creator, and that no attribute really incompatible with it can be correctly ascribed to him.

[p-p]51, 56, 62 wisdom or goodness

[q-q]51, 56 is used to furnish

CHAPTER IV

Fallacies of [a]Observation

§ 1. [*Non-observation, and mal-observation*] From the fallacies which are properly Prejudices, or presumptions antecedent to, and superseding, proof, we pass to those which lie in the incorrect performance of the proving process. And as Proof, in its widest extent, embraces one or more, or all, of three processes, Observation, Generalization, and Deduction; we shall consider in their order the errors capable of being committed in these three operations. And first, of the first mentioned.

A fallacy of misobservation may be either negative or positive; either Non-observation or Mal-observation. It is non-observation, when all the error consists in overlooking, or neglecting, facts or particulars which ought to have been observed. It is mal-observation, when something is not simply unseen, but seen wrong; when the fact or phenomenon, instead of being recognised for what it is in reality, is mistaken for something else.

§ 2. [*Non-observation of instances, and non-observation of circumstances*] Non-observation may either take place by overlooking instances, or by overlooking some of the circumstances of a given instance. If we were to conclude that a fortune-teller was a true prophet, from not adverting to the cases in which his predictions had been falsified by the event, this would be non-observation of instances; but if we overlooked or remained ignorant of the fact that in cases where the predictions had [a]been fulfilled[a], he had been in collusion with some one who had given him the information on which they were grounded, this would be non-observation of circumstances.

The former case, in so far as the act of induction from insufficient evidence is concerned, does not fall under this second class of Fallacies, but under the third, Fallacies of [b] Generalization. In every such case, however, there are two defects or errors instead of one: there is the error of treating the insufficient evidence as if it were sufficient, which is a Fallacy of the third class; and there is the insufficiency itself; the not having better evidence; which, when such evidence, or in other words, when other instances, were to be had,

[a]MS Bad
[a-a]MS, 43, 46 come true
[b]MS Bad

is Non-observation: and the erroneous inference, so far as it is to be attributed to this cause, is a Fallacy of the second class.

It belongs not to our purpose to treat of non-observation as arising from casual inattention, from general slovenliness of mental habits, want of due practice in the use of the observing faculties, or insufficient interest in the subject. The question pertinent to logic is—Granting the want of complete competency in the observer, on what points is that insufficiency on his part likely to lead him wrong? or rather, what sorts of instances, or of circumstances in any given instance, are most likely to escape the notice of observers generally; of mankind at large.

§ 3. [*Examples of non-observation of instances*] First, then, it is evident that when the instances on one side of a question are more likely to be remembered and recorded than those on the other; especially if there be any strong motive to preserve the memory of the first, but not of the latter; these last are likely to be overlooked, and escape the observation of the mass of mankind. This is the recognised explanation of the credit given, in spite of reason and evidence, to many classes of impostors: to quack doctors, and fortune-tellers in all ages; to the "cunning man" of modern times, and the oracles of old. Few have considered the extent to which this fallacy operates in practice, even in the teeth of the most palpable negative evidence. A striking example of it is the faith which the uneducated portion of the agricultural classes, in this and other countries, continue to repose in the prophecies as to weather supplied by almanac makers: though every season affords to them numerous cases of completely erroneous prediction; but as every season also furnishes some cases in which the prediction is [a]fulfilled[a], this is enough to keep up the credit of the prophet, with people who do not reflect on the number of instances requisite for what we have called, in our inductive terminology, the Elimination of Chance; since a certain number of casual coincidences not only may but will happen, between any two unconnected events.

Coleridge, in one of the essays in the *Friend*,[*] has [b] illustrated the matter we are now considering, in discussing the origin of a proverb, "which, differently worded, is to be found in all the languages of Europe," viz., "Fortune favours fools." [c]He ascribes it partly to the "tendency[c] to exaggerate all

[*3 vols. London: Rest Fenner, 1818, Vol. III, pp. 269–70, 275–7.]

[a-a]MS, 43, 46, 51, 56, 62, 65 verified
[b]MS, 43, 46 very happily
[c-c]MS This proverb, says he, "admits of various explanations. . . . It may arise from pity, and the soothing persuasion that Providence is eminently watchful over the helpless, and extends an especial care to those who are not capable of caring for themselves. So used, it breathes the same feeling as 'God tempers the wind to the shorn lamb,' or the more sportive adage, that 'the fairies take care of children and tipsy folk.'" So far,

effects that seem disproportionate to their visible cause, and all circumstances that are in any way strongly contrasted with our notions of the persons under them." Omitting some [d] explanations which would refer the error to mal-observation, or to the other species of non-observation (that of circumstances) [e]I[e] take up the quotation farther on.

Unforeseen coincidences may have greatly helped a man, yet if they have done for him only what possibly from his own abilities he might have effected for himself, his good luck will excite less attention, and the instances be less remembered. That clever men should attain their objects seems natural, and we neglect the circumstances that perhaps produced that success of themselves, without the intervention of skill or foresight; but we dwell on the fact and remember it, as something strange, when the same happens to a weak or ignorant man. So too, though the latter should fail in his undertakings from concurrences that might have happened to the wisest man, yet his failure being no more than might have been expected and accounted for from his folly, it lays no hold on our attention, but fleets away among the other undistinguished waves in which the stream of ordinary life murmurs by us, and is forgotten. Had it been as true as it was notoriously false, that those all-embracing discoveries, which have shed a dawn of *science* on the *art* of chemistry, and give no obscure promise of some one great constitutive law, in the light of which dwell dominion and the power of prophecy; if these discoveries, instead of having been, as they really were, preconcerted by meditation, and evolved out of his own intellect, had occurred by a set of lucky *accidents* to the illustrious father and founder of philosophic alchemy; if they had presented themselves to Professor Davy exclusively in consequence of his *luck* in possessing a particular galvanic battery; if this battery, as far as Davy was concerned, had itself been an *accident*, and not (as in point of fact it was) desired and obtained by him for the purpose of ensuring the testimony of experience to his principles, and in order to bind down material nature under the inquisition of reason, and force from her, as by torture, unequivocal answers to *prepared* and *preconceived* questions,—yet still they would not have been talked of or described as instances of *luck*, but as the natural results of his admitted genius and known skill. But should an accident have disclosed similar discoveries to a mechanic at Birmingham or Sheffield, and if the man should grow rich in consequence, and partly by the envy of his neighbours and partly with good reason, be considered by them as a man *below par* in the general powers of his understanding; then, 'O, what a lucky fellow! Well, Fortune *does* favour fools—that's for certain! It is always so!' And forthwith the exclaimer relates half a dozen similar instances. Thus accumulating the one sort of facts and never collecting the other, we do, as poets in their diction, and quacks of all denominations do in their reasoning, put a part for the whole [f].

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the notion partakes of the character of a fallacy of Bad Generalization. But he continues, "The persuasion itself, in addition to the general religious feeling of mankind, and the scarcely less general love of the marvellous, may be accounted for from our tendency] 43, 46 *as* MS . . . fallacy of Generalization . . . *as* MS

[d]MS, 43, 46 further

[e–e]MS we

[f]Source, MS, 43, 46 , and at once soothe our envy and gratify our love of the marvellous, by the sweeping proverb, Fortune favours fools

This passage very happily sets forth the manner in which, under the loose mode of induction which proceeds *per enumerationem simplicem*, not seeking for instances of such a kind as to be decisive of the question, but generalizing from any which occur, or rather which are remembered, opinions grow up with the apparent sanction of experience, which have no foundation in the laws of nature at all.

Itaque recte respondit ille, [we [g]may[g] say with Bacon,*] qui cum suspensa tabula in templo ei monstraretur eorum, qui vota solverant, quod naufragii periculo elapsi sint, atque interrogando premeretur, anne tum quidem Deorum numen agnosceret, quæsivit denuo, *At ubi sunt illi depicti qui post vota nuncupata perierunt?* Eadem ratio est fere omnis superstitionis, ut in Astrologicis, in Somniis, Ominibus, Nemesibus, et hujusmodi; in quibus, homines delectati hujusmodi vanitatibus, advertunt eventus, ubi implentur; ast ubi fallunt, licet multo frequentius, tamen negligunt, et prætereunt.

And he proceeds to say, that independently of the love of the marvellous, or any other bias in the inclinations, there is a natural tendency in the intellect itself to this kind of fallacy; since the mind is more moved by affirmative instances, though negative ones are of most use in philosophy:

Is tamen humano intellectui error est proprius et perpetuus, ut magis moveatur et excitetur Affirmativis quam Negativis; cum rite et ordine æquum se utrique præbere debeat; quin contra, in omni Axiomate vero constituendo, major vis est instantiæ negativæ.

But the greatest of all causes of non-observation is a preconceived opinion. This it is which, in all ages, has made the whole race of mankind, and every separate section of it, for the most part [h]unobservant[h] of all facts, however abundant, even when passing under their own eyes, which are contradictory to any first appearance, or any received tenet. It is worth while to recal occasionally to the oblivious memory of mankind some of the striking instances in which opinions that the simplest experiment would have shown to be erroneous, continued to be entertained because nobody ever thought of trying that experiment. One of the most remarkable of these was exhibited in the Copernican controversy. The opponents of Copernicus argued that the earth did not move, because if it did, a stone let fall from the top of a high tower would not reach the ground at the foot of the tower, but at a little distance from it, in a contrary direction to the earth's course; in the same manner (said they) as, if a ball is let drop from the mast-head while the ship is in full sail, it does not fall exactly at the foot of the mast, but nearer

**Novum Organum*, [Bk. I,] Aph. 46 [p. 166].

[g-g]MS must
[h-h]MS inobservant

to the stern of the vessel. The Copernicans would have silenced these objectors at once if they had *tried* dropping a ball from the mast-head, [i]since[i] they would have found that it does fall exactly at the foot, as the theory requires: but no; they admitted the spurious fact, and struggled vainly to make out a difference between the two cases. "The ball was no *part* of the ship—and the motion forward was not *natural*, either to the ship or to the ball. The stone, on the other hand, let fall from the top of the tower, was a *part* of the earth; and therefore, the diurnal and [j]annular[j] revolutions which were *natural* to the earth, were also *natural* to the stone: the stone would, therefore, retain the same motion with the tower, and strike the ground precisely at the bottom of it."*

Other examples, scarcely less striking, are recorded by Dr. Whewell,† where imaginary laws of nature have continued to be received as real, merely because no [k] person had steadily looked at facts which almost every one had the opportunity of observing.

A vague and loose mode of looking at facts very easily observable, left men for a long time under the belief that a body ten times as heavy as another falls ten times as fast; that objects immersed in water are always magnified, without regard to the form of the surface; that the magnet exerts an irresistible force; that crystal is always found associated with ice; and the like. These and many others are examples how blind and careless man can be even in observation of the plainest and commonest appearances; and they show us that the mere faculties of perception, although constantly exercised upon innumerable objects, may long fail in leading to any exact knowledge.

[l]If even on physical facts, and these of the most obvious character, the observing faculties of mankind can be to this degree the passive slaves of their preconceived impressions, we need not be surprised that this should be so lamentably true as all experience attests it to be, on things more nearly connected with their stronger feelings—on moral, social, and religious subjects. The information which an ordinary traveller brings back from a foreign country, as the result of the evidence of his senses, is almost always such as exactly confirms the opinions with which he set out. He has had eyes and ears for such things only as he expected to see. Men read the sacred books of their religion, and pass unobserved therein multitudes of things utterly irreconcileable with even their own notions of moral excellence. With the same authorities before them, different historians, alike innocent of intentional misrepresentation, see only what is favourable to Protestants or

*Playfair's *Dissertation*, [Vol. II,] sect. 4 [p. 85].
†*Novum Organon Renovatum*, p. 61.

[i-i]MS, 43 because
[j-j]Source, MS, 43, 46, 51, 56, 62 annual
[k]MS, 43, 46, 51 one
[l-l778]+51, 56, 62, 65, 68, 72

Catholics, royalists or republicans, Charles I or Cromwell; while others, having set out with the preconception that extremes must be in the wrong, are incapable of seeing truth and justice when these are wholly on one side.[l]

The influence of a preconceived theory is well exemplified in the superstitions of barbarians respecting the virtues of medicaments and [m] charms. The negroes, among whom coral, as of old among ourselves, is worn as an amulet, affirm, according to Dr. Paris,* that its colour "is always affected by the state of health of the wearer, it becoming paler in disease." On a matter open to universal observation, a general proposition which has not the smallest vestige of truth is received as a result of experience; the preconceived opinion preventing [n], it would seem, any observation whatever on the subject[n].

§ 4. [*Examples of non-observation of circumstances*] For illustration of the first species of non-observation, that of Instances, what has now been stated may suffice. But there may also be non-observation of some material circumstances, in instances which have not been altogether overlooked—nay, which may be the very instances on which the whole superstructure of a theory has been founded. As, in the cases hitherto examined, a general proposition was too rashly adopted, on the evidence of particulars, true indeed, but insufficient to support it; so in the cases to which we now turn, the particulars themselves have been imperfectly observed, and the singular propositions on which the generalization is grounded, or some at least of those singular propositions, are false.

Such, for instance, was one of the mistakes committed in the celebrated phlogistic theory; a doctrine which accounted for combustion by the extrication of a substance [o]called phlogiston, supposed to be contained in all combustible matter[o]. The hypothesis accorded tolerably well with superficial appearances: the ascent of flame naturally suggests the escape of a substance; and the visible residuum of ashes, in bulk and weight, generally falls extremely short of the combustible material. The error was, non-observation of an important portion of the actual residue, namely, the gaseous products of combustion. When these were at last noticed and brought into account, it appeared to be an universal law, that all substances gain instead of losing weight by undergoing combustion; and after the usual attempt to accommodate the old theory to the new fact by means of an arbitrary hypothesis (that phlogiston had the quality of positive levity instead of gravity),

**Pharmacologia*, p. 21n.

[m]MS, 43, 46, 51, 56, 62 of
[n-n]MS, 43, 46 all observation of such instances as do not accord with it
[o-o]MS supposed to be contained in all combustible matter, and to which the name of phlogiston was given] 43, 46 *as* MS . . . name phlogiston . . . *as* MS

chemists were conducted to the true explanation, namely, that instead of a substance separated, there was on the contrary a substance absorbed.

Many of the absurd practices which have been deemed to possess medicinal efficacy, have been indebted for their reputation to [b]non-observance[b] of some accompanying circumstance which was the real agent in the cures ascribed to them. Thus, of the sympathetic powder of Sir Kenelm Digby:

Whenever any wound had been inflicted, this powder was applied to the weapon that had inflicted it, which was, moreover, covered with ointment, and dressed two or three times a day. The wound itself, in the meantime, was directed to be brought together, and carefully bound up with clean linen rags, but *above all, to be let alone* for seven days, at the end of which period the bandages were removed, when the wound was generally found perfectly united. The triumph of the cure was decreed to the myterious agency of the sympathetic powder which had been so assiduously applied to the weapon, whereas it is hardly necessary to observe that the promptness of the cure depended upon the total exclusion of air from the wound, and upon the sanative operations of nature not having received any disturbance from the officious interference of art. The result, beyond all doubt, furnished the first hint which led surgeons to the improved practice of healing wounds by what is technically called the *first intention.**

In all records, [adds Dr. Paris,] of extraordinary cures performed by mysterious agents, there is a great desire to conceal the remedies and other curative means which were simultaneously administered with them; thus Oribasius commends in high terms a necklace of Pæony root for the cure of epilepsy; but we learn that he always took care to accompany its use with copious evacuations, although he assigns to them no share of credit in the cure. In later times we have a good specimen of this species of deception, presented to us in a work on scrofula by Mr. Morley, written, as we are informed, for the sole purpose of restoring the much injured character and use of the Vervain; in which the author directs the root of this plant to be tied with a yard of white satin riband around the neck, where it is to remain until the patient is cured; but mark—during this interval he calls to his aid the most active medicines in the materia medica.†

In other cases the cures really produced by rest, regimen, and amusement, have been ascribed to the medicinal, or occasionally to the supernatural, means which were put in requisition.

The celebrated John Wesley, while he commemorates the triumph of sulphur and supplication over his bodily infirmity, forgets to appreciate the resuscitating influence of four months' repose from his apostolic labours; and such is the disposition of the human mind to place confidence in the operation of mysterious agents, that we find him more disposed to attribute his cure to a brown paper

**Ibid.*, pp. 22–4. [The reference is to Digby's *A Late Discourse . . . touching the Cure of Wounds by the Powder of Sympathy*. Tr. R. White. 2nd ed. London: Lowndes, 1658.]

†*Ibid.*, p. 28. [The reference is to John Morley's *An Essay on the Nature and Cure of Scrophulous Disorders*. London: Buckland, 1767.]

[b-b]MS inobservance

plaister of egg and brimstone, than to Dr. Fothergill's salutary prescription of country air, rest, asses' milk, and horse exercise.*

In the following example, the circumstance overlooked was of a somewhat different character.

When the yellow fever raged in America, the practitioners trusted exclusively to the copious use of mercury; at first this plan was deemed so universally efficacious, that, in the enthusiasm of the moment, it was triumphantly proclaimed that death never took place after the mercury had evinced its effect upon the system: all this was very true, but it furnished no proof of the efficacy of that metal, since the disease in its aggravated form was so rapid in its career, that it swept away its victims long before the system could be brought under mercurial influence, while in its milder shape it passed off equally well without any assistance from art.†

In these examples the circumstance overlooked was cognizable by the senses. In other cases, it is one the knowledge of which could only be arrived at by reasoning; but the fallacy may still be classed under the head to which, for want of a more appropriate name, we have given the appellation Fallacies of Non-observation. It is not the nature of the faculties which ought to have been employed, but the non-employment of them, which constitutes this Natural Order of Fallacies. Wherever the error is negative, not positive; wherever it consists [c]especially[c] in *overlooking*, in being ignorant or unmindful of some fact which, if known and attended to, would have made a difference in the conclusion arrived at; the error is properly placed in the Class which we are considering. In [d]this[d] Class, there is not, as in all other fallacies there is, a positive mis-estimate of evidence actually had. The conclusion would be just, if the portion which is seen of the case were the whole of it; but there is another portion overlooked, which vitiates the result.

For instance, there is a remarkable doctrine which has occasionally found a vent in the public speeches of unwise legislators, but which only in one instance that I am aware of has received the sanction of a [e]philosophical writer[e], namely M. [f] Cousin, who in his preface to the *Gorgias* of Plato, contending that punishment must have some other and higher justification than the prevention of crime, makes use of this argument—that if punishment were only for the sake of example, it would be indifferent whether we punished the innocent or the guilty, since the punishment, considered as an example, is equally efficacious in either case.[*] Now we must, in order to go

**Ibid.*, p. 62. [For the references to Wesley and Fothergill, see *The Journal of the Rev. John Wesley*. 4 vols. London: Kershaw, 1827, Vol. II, pp. 262–3.]

†*Ibid.*, pp. 61–2.

[*Victor Cousin, "Argument philosophique," *Gorgias*, in *Oeuvres de Platon*. 13 vols. Paris: Bossange, 1832–40, Vol. III, pp. 167–8.]

c–cMS, 43, 46, 51, 56, 62 specially
d–dMS that
e–eMS, 43, 46 philosopher
fMS, 43 Victor

along with [g]this reasoning[g], suppose, that the person who feels himself under temptation, observing somebody punished, concludes himself to be in danger of being punished likewise, and is terrified accordingly. But it is forgotten that if the person punished is [h]supposed to be[h] innocent, or even if there be any doubt of his guilt, the spectator will reflect that his own danger, whatever it may be, is not contingent on his guiltiness, but threatens him equally if he remains innocent, and how therefore is he deterred from guilt by the apprehension of such punishment? M. Cousin supposes that [i]people[i] will be dissuaded from guilt by whatever renders the condition of the guilty more perilous, forgetting that the condition of the innocent (also one of the elements in the calculation) is, in the case supposed, made perilous in precisely an equal degree. This is a fallacy of overlooking; or of non-observation, within the intent of our classification.

Fallacies of this description are the great stumbling-block to [j]correct thinking[j] in political economy. The economical workings of society afford [k]numerous[k] cases in which the effects of a cause consist of two sets of phenomena: the one immediate, concentrated, obvious to [l]all[l] eyes, and passing, in common apprehension, for the whole effect; the other widely diffused, or lying deeper under the surface, and which is exactly contrary to the former. Take, for instance, the [m]common[m] notion so plausible at the first glance, of the encouragement given to industry by lavish expenditure. A, who spends his whole income, and even his capital, in expensive living, is supposed to give great employment to labour. B, who lives on [n]a small portion[n], and invests the remainder in the funds, is thought to give little or no employment. For everybody sees the gains which are made by A's tradesmen, servants, and others, while his money is spending. B's savings, on the contrary, pass into the hands of the person whose stock he purchased, who with it pays a debt he owed to some banker, who lends it again to some merchant or manufacturer; and the capital being laid out in hiring spinners and weavers, or carriers and the crews of merchant [o]vessels[o], not only gives immediate employment to [p]at least as much industry[p] as A employs during the whole of his career, but coming back with increase by the sale of the goods which have been manufactured or imported, [q]forms[q] a fund for the employment of the same and perhaps a greater quantity of labour in perpetuity. But the [r] observer does not see, and therefore does not consider, what becomes of B's money; he does see what is done with A's: he observes the amount of industry which A's profusion feeds; he observes not the far greater quantity

[g-g]MS, 43 M. Cousin
[h-h]+43, 46, 51, 56, 62, 65, 68, 72
[i-i]MS, 43, 46 men
[j-j]MS, 43, 46 just views
[k-k]MS, 43, 46 innumerable
[l-l]MS, 43, 46 vulgar
[m-m]MS, 43, 46 vulgar
[n-n]MS little
[o-o]51, 56 ships
[p-p]MS, 43 as much industry at once
[q-q]MS, 43 form
[r]MS, 43, 46 careless

which it prevents from being fed; and thence the prejudice, universal to the time of Adam Smith, [s] that prodigality encourages industry, and parsimony is a discouragement to it.

The common argument against free trade [t]was[t] a fallacy of the same nature. The purchaser of British silk encourages British industry; the purchaser of Lyons silk encourages only French; the former conduct is [u]patriotic[u], the latter ought to be [v]prevented[v] by law. The circumstance is overlooked, that the purchaser of any foreign commodity [w]necessarily[w] causes, directly or indirectly, the export of an equivalent value of some [x]article of home production[x] (beyond what would otherwise be exported), either to the same foreign country or to some other; which fact, though from the complication of the circumstances it cannot always be verified by specific observation, no observation can possibly be brought to contradict, while the evidence of reasoning on which it rests is [y] irrefragable. The fallacy is, therefore, the same as in the preceding case, that of seeing a part only of the phenomena, and imagining that part to be the whole: and may be ranked among Fallacies of Non-observation.

§ 5. [*Mal-observation characterized and exemplified*] To complete the examination of the second of our five classes, we have now to speak of Mal-observation; in which the error does not lie in the fact that something is unseen, but that something seen is seen wrong.

Perception being infallible evidence of whatever is really perceived, the error now under consideration can be committed no otherwise than by mistaking for perception what is in fact inference. We have formerly shown how intimately the two are blended in almost everything which is called observation, and still more in every Description.* What is actually on any occasion perceived by our senses being so minute in amount, and generally so unimportant a portion of the state of facts which we wish to ascertain or to communicate; it would be absurd to say that either in our observations, or in conveying their result to others, we ought not to mingle inference with fact; all that can be said is, that when we do so we ought to be aware of what we are doing, and to know what part of the assertion rests on consciousness, and is therefore indisputable, what part on inference, and is therefore questionable.

One of the most celebrated examples of an universal error produced by

*Supra, pp. 641ff.

[s]MS, 43, 46 and even yet only exploded among persons more than commonly instructed,

[t-t]MS, 43, 46, 51, 56 is [u-u]MS, 43, 46, 51, 56, 62, 65 patriotism

[v-v]MS, 43, 46, 51, 56, 62, 65, 68 interdicted

[w-w]MS, 43, 46 of necessity

[x-x]MS, 43, 46 English article [y]MS, 43, 46 absolutely

mistaking an inference for the direct evidence of the senses, was the resistance made, on the ground of common sense, to the Copernican system. People fancied they *saw* the sun rise and set, the stars revolve in circles round the pole. We now know that they saw no such thing; what they really saw [a]was[a] a set of appearances, equally reconcileable with the theory they held and with a totally different one. It seems strange that such an instance as this, of the testimony of the senses pleaded with the most entire conviction in favour of something which was a mere inference of the judgment, and, as it turned out, a false inference, should not have opened the eyes of the bigots of common sense, and inspired them with a more modest distrust of the competency of mere ignorance to judge the conclusions of [b]cultivated thought[b].

In proportion to any person's deficiency of knowledge and mental cultivation, is generally his inability to discriminate between his inferences and the perceptions on which they were grounded. Many a marvellous tale, many a scandalous anecdote, owes its origin to this incapacity. The narrator relates, not what he saw or heard, but the impression which he derived from what he saw or heard, and of which perhaps the greater part consisted of inference, though the whole is related not as inference but as matter-of-fact. The difficulty of inducing witnesses to restrain within any moderate limits the intermixture of their [c] inferences with the narrative of their perceptions, is well known to experienced cross-examiners; and still more is this the case when ignorant persons attempt to describe any natural phenomenon. "The simplest narrative," says [d] Dugald Stewart,* "of the most illiterate observer involves more or less of hypothesis; nay, in general, it will be found that, in proportion to his ignorance, the greater is the number of conjectural principles involved in his statements. A village apothecary (and, if possible, in a still greater degree, an experienced nurse) is seldom able to describe the plainest case, without employing a phraseology of which every word is a theory: whereas a simple and genuine specification of the phenomena which mark a particular disease; a specification unsophisticated by fancy, or by preconceived opinions, may be regarded as unequivocal evidence of a mind trained by long and successful study to the most difficult of all arts, that of the faithful *interpretation* of nature." [e]

**Elements of the Philosophy of the Mind*, Vol. II, Chap. iv, §5 [p. 443].

[a–a]MS, 43, 46 were   [b–b]MS, 43, 46 science
[c]MS own   [d]MS Professor
[e]MS, 43, 46 [*footnote:*] †The following anecdote, related by Dr. Paris, (*Pharmacologia*, pp. 76n–77n,) is an amusing instance of an inference mistaken for a direct perception. "Shortly after Sir Humphry Davy had succeeded in decomposing the fixed alkalies, a portion of potassium" (a substance so light as to swim upon water) "was placed in the hand of one of our most distinguished chemists, with a query as to its nature. The philosopher observing its aspect and splendour did not hesitate in pronouncing it to be metallic, and uniting at once the idea of weight with that of metal, the evi-

The universality of the confusion between perceptions and the inferences drawn from them, and the rarity of the power to discriminate the one from the other, ceases to surprise us when we consider that in the far greater number of instances the actual perceptions of our senses are of no importance or interest to us except as marks from which we infer something beyond them. It is not the colour and superficial extension perceived by the eye that [f]are[f] important to us, but the object, of which those visible appearances testify the presence; and where the sensation itself is indifferent, as it generally is, we have no motive to attend particularly to it, but acquire a habit of passing it over without distinct consciousness, and going on at once to the inference. So that to know what the sensation actually was, is a study in itself, to which [g]painters, for example, have to train themselves[g] by special and long-continued discipline and application. In things further removed from the dominion of the outward senses, no one who has not great experience in psychological analysis is competent to break this intense association; and [h]when[h] such analytic habits do not exist in the requisite degree, it is hardly possible to mention any of the habitual judgments of mankind on subjects of a high degree of abstraction, from the being of [i]a[i] God and the immortality of the soul down to the multiplication table, which are not, or have not been, considered as matter of direct intuition. [j]So strong is[j] the tendency to ascribe an intuitive character to judgments which are mere inferences, and often false ones. No one can doubt that many a deluded visionary has actually believed that he was directly inspired from Heaven, and that the Almighty had conversed with him face to face; which yet was only, on his part, a conclusion drawn from appearances to his senses, or feelings in his internal consciousness, which [k]afforded no warrant for any such belief. A caution, therefore, against this class of errors, is not only needful but indispensable[k]; though to determine whether, on any of the great questions of metaphysics, such errors are actually committed, belongs not to this place, but, as [l]I[l] have so often said, to a different science.

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dence of his senses was even insufficient to dissever ideas so inseparably associated in his mind, and, balancing the specimen on his fingers, he exclaimed, 'it is certainly metallic, and *very ponderous*.'" He mistook his *judgment* of the ponderosity of the substance for a *sensation* of it.

[f-f]MS is

[g-g]MS, 43, 46 the painter, for example, has to train himself

[h-h]MS where [*printer's error?*]

[i-i]+51, 56, 62, 65, 68, 72

[j-j]MS, 43, 46 In saying this I do not seek to prejudge the question of transcendental metaphysics, how far a certain number of these habitual judgments are really intuitive, or otherwise. I only point out the strength of

[k-k]MS, 43, 46 were altogether an insufficient foundation for any such belief. The caution, therefore, which is needful against this class of errors, could not with any propriety have been foregone

[l-l]MS we

CHAPTER V

Fallacies of [a]Generalization

§ 1. [*Character of the class*] The class of Fallacies of which we are now to speak, is the most extensive of all; embracing a greater number and variety of unfounded inferences than any of the other classes, and which it is even more difficult to reduce to sub-classes or species. If the attempt made in the preceding books to define the principles of well-grounded generalization has been successful, all generalizations not conformable to those principles might, in a certain sense, be brought under the present class: when however the rules are known and kept in view, but a casual lapse committed in the application of them, this is a blunder, not a fallacy. To entitle an error of generalization to the latter epithet, it must be committed on principle; there must lie in it some erroneous general conception of the inductive process; the legitimate mode of drawing conclusions from observation and experiment must be fundamentally misconceived.

Without attempting anything so chimerical as an exhaustive classification of all the misconceptions which can exist on the subject, let us content ourselves with noting, among the cautions which might be suggested, a few of the most useful and needful.

§ 2. [*Certain kinds of generalization* [a] *must always be groundless*] In the first place, there are certain kinds of generalization which, if the principles already laid down be correct, *must* be groundless: experience cannot afford the necessary conditions for establishing them by a correct induction. Such, for instance, are all inferences from the order of nature existing on the earth, or in the solar system, to that which may exist in remote parts of the universe; where the phenomena, for aught we know, may be entirely different, or may succeed one another according to different laws, or even according to no fixed law at all. Such, again, in matters dependent on causation, are all universal negatives, all propositions that assert impossibility. The non-existence of any given phenomenon, however uniformly experience may as yet have testified to the fact, proves at most that no cause, adequate to its production, has yet manifested itself; but that no such causes exist in nature

[a]MS Bad
[a]MS *which*

can only be inferred if we [b]are so foolish as to suppose[b] that we know all the forces in nature. The supposition would at least be premature while our acquaintance with some even of those which we do know is so extremely recent. And however much our knowledge of nature may hereafter be extended, it is not easy to see how that knowledge could ever be complete, or how, if it were, we could ever be assured of its being so.

The only laws of nature which afford sufficient warrant for attributing impossibility [c](even with reference to the existing order of nature, and to our own region of the universe)[c], are first, those of number and extension, which are paramount to the laws of the succession of phenomena, and not exposed to the agency of counteracting causes; and secondly, the universal law of causality itself. That no variation in any effect or consequent will take place while the whole of the antecedents remain the same, may be affirmed with full assurance. But, that the addition of some new antecedent might not entirely alter and subvert the accustomed consequent, or that antecedents competent to do this do not exist in nature, we are in no case empowered positively to conclude.

§ 3. [*Attempts to resolve [a]phenomena radically different[a] into the same*] It is next to be remarked that all generalizations which profess, like the theories of Thales, Democritus, and others of the early Greek [b]speculators[b], to resolve all things into some one element, or like many modern theories, to resolve phenomena radically different into the same, are necessarily false. By radically different phenomena I mean impressions on our senses which differ in quality, and not merely in degree. On this subject what appeared necessary was said in the chapter on the Limits to the Explanation of Laws of Nature; but as the fallacy is even in our own times a common one, I shall touch on it somewhat further in this place.

When we say that the force which [c]retains[c] the planets in their orbits is resolved into gravity, or that the force which makes substances combine chemically is resolved into electricity, we assert in the one case what is, and in the other case what might, and probably will ultimately, be a legitimate result of induction. In both these cases motion is resolved into motion. The assertion is, that a case of motion, which was supposed to be special, and to follow a distinct law of its own, conforms to and is included in the general law which regulates another class of motions. But, from these and similar generalizations, countenance and currency [d]have[d] been given to attempts to resolve, not motion into motion, but heat into motion, light into motion,

[b-b]MS, 43, 46, 51, 56 commit the absurdity of supposing
[c-c]+51, 56, 62, 65, 68, 72
[a-a]MS, 43, 46 *radically different phenomena*
[b-b]MS, 43, 46 philosophers
[c-c]MS, 43, 46, 51, 56 holds [d-d]MS, 43, 46 has

sensation itself into motion [e]; states of consciousness into states of the nervous system, as in the ruder forms of the materialist philosophy; vital phenomena into mechanical or chemical processes, as in some schools of physiology.

Now I am far from pretending that it may not be capable of proof, or that it [f]is not an[f] important addition to our knowledge if proved, that certain motions in the particles of bodies are [g] the *conditions* of the production of heat or light; that certain assignable physical modifications of the nerves may be [h] the conditions not only of our sensations or emotions, but even of our thoughts; that certain mechanical and chemical conditions may, in the order of nature, be sufficient to determine to action the physiological laws of life. All I insist upon, in common with every [i]thinker who entertains any clear idea of the logic of science[i], is, that it shall not be supposed that by proving these things one step would be made towards a real explanation of heat, light, or sensation; or that the generic peculiarity of those phenomena can be in the least degree evaded by any such discoveries, however well established. Let it be shown, for instance, that the most complex series of physical causes and effects succeed one another in the eye and in the brain to produce a sensation of colour; rays falling on the eye, refracted, converging, crossing one another, making an inverted image on the retina, and after this a motion—let it be a vibration, [j]or[j] a rush of nervous fluid, or whatever else you are pleased to suppose, along the optic nerve—a propagation of this motion to the brain itself, and as many more different motions as you choose; still, at the end of these motions, there is something which is not [k] motion, there is a feeling or sensation of colour. Whatever number of motions we may be able to interpolate, and whether they be real or imaginary, we shall still find, at the end of the series, a motion antecedent and a colour consequent. The mode in which any one of the motions produces the next, [l]may[l] possibly be susceptible of explanation by some general law of motion [m]: but the mode in which the last motion produces the sensation of colour, cannot be explained by any law of motion; it is the law of colour: which is, and must always remain, a peculiar thing. Where our consciousness recognises between two phenomena an inherent distinction; where we are sensible of a difference which is not merely of degree, and feel that no adding one of the phenomena

[e]MS, 43, 46, 51, 56 (as in Hartley's doctrine of vibrations)
[f-f]MS, 43, 46 would not be a very] 51, 56, 62, 65 would not be an] 68 will not be an
[g]MS, 43, 46, 51, 56, 62, 65, 68 among
[h]MS, 43, 46 among
[i-i]MS, 43, 46 sober thinker since modern science has been definitively constituted
[j-j]+43, 46, 51, 56, 62, 65, 68, 72
[k]MS, 43 a
[l-l]MS, 43, 46, 51, 56, 62, 65, 68 might
[m]MS, 43, 46 previously known

to itself would produce the other; any theory which attempts to bring either under the laws of the other must be false; though a theory which [n]merely[n] treats the one as a cause or condition of the other, may possibly be true.

§ 4. [*Fallacy of mistaking empirical for causal laws*] Among the remaining forms of erroneous generalization, several of those most worthy of and most requiring notice have fallen under our examination in former places, where, in investigating the rules of correct induction, we have had occasion to advert to the distinction between it and some common mode of the incorrect. In this number is what I have formerly called the natural Induction of uninquiring minds, the induction of the ancients, which proceeds *per enumerationem simplicem*: "This, that, and the other A are B, I cannot think of any A which is not B, therefore every A is B." As a final condemnation of this rude and slovenly mode of generalization, I will quote Bacon's emphatic denunciation of it; the most important part, as I have more than once ventured to assert, of the permanent service rendered by him to philosophy. "Inductio quæ procedit per enumerationem simplicem, res puerilis est, et precario concludit" (concludes only *by your leave*, or provisionally,) "et periculo exponitur ab instantiâ contradictoriâ, et plerumque secundum pauciora quam par est, et *ex his tantummodo quæ præsto sunt* pronunciat. At Inductio quæ ad inventionem et demonstrationem Scientiarum et Artium erit utilis, Naturam separare debet, per rejectiones et exclusiones debitas; ac deinde post negativas tot quot sufficiunt, super affirmativas concludere."[*]

I have already said that the mode of Simple Enumeration is still the common and received method of Induction in whatever relates to man and society. Of this a very few instances, more by way of memento than of instruction, may suffice. What, for example, is to be thought of all the "common-sense" maxims for which the following may serve as the universal formula, "Whatsoever has never been, will never be." As for example: negroes have never been as civilized as whites sometimes are, therefore it is impossible they should be so. Women, as a class, [a]are supposed not to have hitherto been equal in intellect to men[a], therefore they are necessarily inferior. Society cannot prosper without this or the other institution; *e.g.* in Aristotle's time, without slavery; in later times, without an established priesthood, without artificial distinctions of [b]rank[b], &c. One [c]poor person[c] in a

[*Novum Organum*, Bk. I, Aph. 105, p. 205; JSM's italics.]

[n-n]+43, 46, 51, 56, 62, 65, 68, 72

[a-a]MS have never hitherto been equal in intellectual energy and compass to men] 43, 46 have not hitherto equalled men as a class in intellectual energy and comprehensiveness] 51 *as* 71 . . . men (in this case the fact itself is not true)] 56 *as* 51 . . . not authentic)

[b-b]MS, 43, 46, 51, 56, 62, 65 ranks

[c-c]MS, 43, 46 working man

thousand, educated, while the nine hundred and ninety-nine remain uneducated, has usually aimed at raising himself out of his class, therefore education makes people dissatisfied with [d]the condition of a labourer[d]. Bookish men, taken from speculative pursuits and set to work on something they [e]know[e] nothing about, have generally been found or thought to do it ill; therefore philosophers are unfit for business, &c. &c. All these are inductions by simple enumeration. Reasons having some reference to the canons of scientific investigation [f]have been[f] attempted to be given [g], however unsuccessfully, for some[g] of these propositions; but to the multitude of those who parrot them, the *enumeratio simplex, ex his tantummodo quæ præsto sunt pronuncians,* is the sole evidence. Their fallacy consists in this, that they are inductions without elimination: there has been no real comparison of instances, nor even ascertainment of the material [h]facts[h] in any given instance. There is also the further error, of forgetting that such generalizations, even if well established, [i]could not be ultimate truths, but must be results of[i] laws much more elementary; and therefore [j], until deduced from such,[j] could at most be admitted as empirical laws, holding good within the limits of space and time by which the particular observations that suggested the generalization were bounded.

This error, of placing mere empirical laws, and laws in which there is no direct evidence of causation, on the same footing of certainty as laws of cause and effect, an error which is at the root of perhaps the greater number of bad inductions, is exemplified only in its grossest form in the kind of generalizations to which we have now referred. These, indeed, do not possess even the degree of evidence which pertains to a well-ascertained empirical law; but admit of refutation on the empirical ground itself, without ascending to [k]causal[k] laws. A little reflection, indeed, will show that mere negations can only form the ground of the lowest and least valuable kind of empirical law. A phenomenon has never been noticed; this only proves that the conditions of that phenomenon have not yet occurred in [l] experience, but does not prove that they may not occur [m]hereafter[m]. There is a [n]better[n] kind of empirical law than this, namely, when a phenomenon which is observed presents within the limits of observation a series of gradations, in which a regularity, or something like a mathematical law, is perceptible: from which, therefore, something may be rationally presumed as to those terms of the series which are

[d-d]MS, 43, 46 their condition in life
[e-e]MS knew
[f-f]MS, 43, 46 may have been given or] 51, 56, 62, 65 may have been
[g-g]MS, 43, 46 for several
[h-h]MS, 43, 46, 51, 56, 62, 65 circumstances
[i-i]MS, 43, 46 cannot be ultimate truths, but must be the results of other
[j-j]+46, 51, 56, 62, 65, 68, 72
[k-k]MS causative
[l]MS, 43, 46, 51 human
[m-m]MS, 43, 46 to-morrow
[n-n]MS, 43, 46 higher

beyond the limits of observation. But in negation there are no gradations, and no series: the generalizations, therefore, which deny the possibility of any given condition of man and society merely because it has never yet been witnessed, cannot possess this higher degree of validity even as empirical laws. What is more, the minuter examination which that higher order of empirical laws presupposes, being applied to the subject-matter of these, not only does not confirm but actually refutes them. For in reality the past history of Man and Society, instead of exhibiting them as immovable, unchangeable, incapable of ever presenting new phenomena, shows them on the contrary to be, in many most important particulars, not only changeable, but actually undergoing a progressive change. The empirical law, therefore, best expressive, in most cases, of the genuine result of observation, would be, not that such and such a phenomenon will continue unchanged, but that it will continue to change in some particular manner.

Accordingly, while almost all generalizations relating to Man and Society, antecedent to the last fifty [o]or sixty[o] years, have erred in the gross way which we have attempted to characterize, namely, by implicitly assuming that human nature and society will for ever revolve in the same orbit, and exhibit essentially the same phenomena; which is also the vulgar error of [p]the ostentatiously practical, [q]the[q] votaries of so-called[p] common sense, in our [r] day, especially in Great Britain; the more thinking minds of the present age, having applied a more minute analysis to the past records of our race, have for the most part adopted [s]a[s] contrary opinion, that the human species is in a state of necessary progression, and that from the terms of the series which are past we may infer [t]positively[t] those which are yet to come. Of this doctrine, considered as a philosophical tenet, we shall have occasion to speak [u]more[u] fully in the concluding Book. If not, in all its forms, free from error, it is at least [v] free from the gross and stupid error which we previously exemplified. But, in all except the most eminently philosophical minds, it is infected with precisely the same *kind* of fallacy as that is. For we must remember that even this other and better generalization, the progressive change in the condition of the human species, is, after all, but an empirical law: to which, [w]too[w], it is not difficult to point out exceedingly large exceptions; and even if these could be got rid of, either by disputing the facts or by explaining and limiting the theory, the general objection remains valid against the supposed law, as applicable to any other than what, in our third book, were termed Adjacent Cases. For not only [x]is it[x] no ultimate, but not even a [y]causal[y] law. Changes

[o-o]+72
[p-p]MS, 43, 46 practicalism and
[q-q]51, 56 and
[r]MS, 43, 46, 51, 56, 62 own
[s-s]MS, 43, 46, 51 the
[t-t]MS, 43, 46 with certainty
[u-u]+51, 56, 62, 65, 68, 72
[v]MS, 43, 46, 51, 56 always
[w-w]MS, 43, 46 moreover
[x-x]MS it is
[y-y]MS causative

do indeed take place in human affairs, but every one of those changes depends on determinate causes; the "[z]progressiveness[z] of the species" is not a cause, but a summary expression for the general result of all the causes. So soon as, by a quite different sort of induction, it shall be ascertained what causes have produced these successive changes, from the beginning of history, in so far as they have really taken place, and by what causes of a contrary tendency they have been occasionally checked or entirely counteracted, we [a]may then be prepared to predict the future with reasonable foresight; we may be in possession of the real *law* of the future; and may[a] be able to declare on what circumstances the continuance of the same onward movement will eventually depend. But this it is the error of many of the more advanced thinkers, in the present age, to overlook; and to imagine that the empirical law collected from a mere comparison of the condition of our species at different past times, is a real law, is *the* law of its changes, not only past but also to come. The truth is, that the causes on which the phenomena of the moral world depend, are in every age, and almost in every country, combined in some different proportion; so that it is scarcely to be expected that the general result of them all should conform [b]very closely,[b] in its details at least, to any uniformly progressive series. And all generalizations which affirm that mankind have a tendency to grow better or worse, richer or poorer, more cultivated or more barbarous, that population increases faster than subsistence, or subsistence than population, that inequality of [c]fortune[c] has a tendency to increase or to break down, and the like, propositions of considerable value as empirical laws within certain (but generally rather narrow) limits, are in reality true or false according to times and circumstances.

What we have said of empirical generalizations from times past to times still to come, holds equally true of similar generalizations from present times to times past; when [d]persons[d] whose acquaintance with moral and social facts is confined to their own age, take the men and the things of that age for the type of men and things in general, and apply without scruple to the interpretation of the events of history, the empirical laws which represent sufficiently for daily guidance the common phenomena of human nature at that time and in that particular state of society. If examples are wanted, almost every historical work, until a very recent period, abounded in them. The same may be said of those who generalize empirically from the people of their own country to the people of other countries, as if human beings felt, judged, and acted everywhere in the same manner.

[z-z]MS, 43, 46 progressibility
[a-a]MS, 43, 46, 51, 56, 62, 65 shall then . . . we shall be . . . and shall
[b-b]+43, 46, 51, 56, 62, 65, 68, 72
[c-c]MS, 43, 46, 51, 56, 62 fortunes [*printer's error?*]
[d-d]MS, 43, 46 men

§ 5. [Post hoc, ergo propter hoc; *and the deductive fallacy corresponding to it*] In the foregoing instances, the distinction is confounded between empirical laws, which express merely the customary order of the succession of effects, and the laws of causation on which the effects depend. There may, however, be incorrect generalization when this mistake is not committed; when the investigation takes its proper direction, that of causes, and the result erroneously obtained purports to be a really [a]causal[a] law.

The most vulgar form of this fallacy is that which is commonly called *post hoc, ergo propter hoc*, or, *cum hoc, ergo propter hoc*. As when it [b]was inferred that England owed[b] her industrial pre-eminence to her restrictions on commerce: as when the old school of financiers, and [c]some speculative writers[c], maintained that the national debt was one of the causes of [d] national prosperity; as when the excellence of the Church, of the Houses of Lords and Commons, of the procedure of the law courts, &c., [e]were[e] inferred from the mere fact that the country [f]had[f] prospered under them. In [g]such cases as these[g], if it can be rendered probable by other evidence that the supposed causes have some tendency to produce the effect ascribed to them, the fact of its having been produced, though only in one instance, is of some value as a verification by specific experience: but in itself it goes scarcely any way at all towards establishing such a tendency, since, admitting the effect, a hundred other antecedents could show an equally strong title of *that* kind to be considered as the cause.

In these examples we see bad generalization *à posteriori*, or empiricism properly so called: causation inferred from casual conjunction, without either due elimination, or any presumption arising from known properties of the supposed agent. But bad generalization *à priori* is fully as common: which is properly called false theory; conclusions drawn [h], by way of deduction,[h] from properties of some one agent which is known or supposed to be present, all other coexisting agents being overlooked. As the former is the error of sheer ignorance, so the latter is especially that of [i]semi-instructed[i] minds; and is mainly committed in attempting to explain complicated phenomena by a simpler theory than their nature admits of. As when one school of physicians sought for the universal principle of all disease in "lentor and morbid viscidity of the blood," and imputing most bodily derangements to mechanical ob-

[a-a]MS causative
[b-b]MS, 43, 46, 51, 56 is inferred that England owes
[c-c]MS, 43 , I am sorry to add, Coleridge] 46 Coleridge
[d]MS, 43, 46 the
[e-e]MS, 43, 46, 51, 56 are
[f-f]MS, 43, 46, 51, 56, 62 has
[g-g]MS, 43, 46, 51, 56 these and similar cases
[h-h]+43, 46, 51, 56, 62, 65, 68, 72
[i-i]MS, 43, 46 instructed

structions, thought to cure them by mechanical remedies;* while another, the chemical school, "acknowledged no source of disease but the presence of some hostile acid or alkali, or some deranged condition in the chemical composition of the fluid or solid parts," and conceived, therefore, that

all remedies must act by producing chemical changes in the body. We find Tournefort busily engaged in testing every vegetable juice, in order to discover in it some traces of an acid or alkaline ingredient, which might confer upon it medicinal activity. The fatal errors into which such an hypothesis was liable to betray the practitioner, [j]received[j] an awful illustration in the history of the memorable fever that raged at Leyden in the year 1699, and which consigned two-thirds of the population of that city to an untimely grave; an event which in a great measure depended upon the Professor Sylvius de la Boe, who having just embraced the chemical doctrines of Van Helmont, assigned the origin of the distemper to a prevailing acid, and declared that its cure could alone [k][only][k] be effected by the copious administration of absorbent and testaceous medicines.† [l]

These aberrations in medical theory have their exact parallels in [m]politics[m]. All the doctrines which ascribe absolute goodness to particular forms of government, particular social arrangements, and even to particular modes of education, without reference to the state of civilization and the various distinguishing characters of the society for which they are intended, are open to the same objection—that of assuming one class of influencing circumstances to be the paramount rulers of phenomena which depend in an equal or greater degree on many others. But on these considerations it is the less

*"Thus Fourcroy," says Dr. Paris, "explained the operation of mercury by its specific gravity, and the advocates of this doctrine favoured the general introduction of the preparations of iron, especially in scirrhus of the spleen or liver, upon the same hypothetical principle; for, say they, whatever is most forcible in removing the obstruction must be the most proper instrument of cure; such is steel, which, besides the attenuating power with which it is furnished, has still a greater force in this case from the gravity of its particles, which, being seven times specifically heavier than any vegetable, acts in proportion with a stronger impulse, and therefore is a more powerful deobstruent. This may be taken as a specimen of the style in which these mechanical physicians reasoned and practised." *Pharmacologia*, pp. 38–9.

†*Ibid.*, pp. 39–40.

[j-j]Source, MS, 43, 46 receive

[k-k]+56, 62, 65, 68, 72 [*JSM's square brackets*]

[l]MS, 43, 46 John Brown, the author of the famous Brunonian Theory, "generalized diseases, and brought all within the compass of two grand classes, those of increased and diminished excitement;" and maintained "that every agent which could operate on the human body was a stimulant, having an identity of action, and differing only in the degree of its force; so that according to his views the lancet and the brandy bottle were but the opposite extremes of one and the same class."* [*footnote:*] **Ibid.*, p. 43. [See *The Elements of Medicine*, Vols. II and III of *The Works of Dr. John Brown*. 3 vols. London: Johnson, 1804.]

[m-m]MS political [*printer's error?*]

necessary that we should now dwell, as they will occupy our attention [n]more[n] largely in the concluding Book.

§ 6. [*Fallacy of False Analogies*] The last of the modes of erroneous generalization to which I shall advert, is that to which we may give the name of False Analogies. This Fallacy stands distinguished from those already treated of by the peculiarity, that it does not even simulate a complete and conclusive induction, but consists in the misapplication of an argument which is at best only admissible as an inconclusive presumption, where real proof is unattainable.

An argument from analogy, is an inference that what is true in a certain case, is true in a case known to be somewhat similar, but not known to be exactly parallel, that is, [a]to be[a] similar in all the material circumstances. An object has the property B: another object is not known to have that property, but resembles the first in a property A, not known to be connected with B; and the conclusion to which the analogy points, is that this object has the property B also. As, for example, that the planets are inhabited, because the earth is [b]so[b]. The planets resemble the earth in describing elliptical orbits round the sun, in being attracted by it and by one another, in being [c]nearly[c] spherical, revolving on their axes, &c.; [d]and, as we have now reason to believe from the revelations of the spectroscope, are composed, in great part at least, of similar materials;[d] but it is not known that any of these properties, or all of them together, are the conditions on which the possession of inhabitants is dependent, or are [e] marks of those conditions. Nevertheless, so long as we do not know what the conditions are, they *may* be connected by some law of nature with those common properties; and to the extent of that possibility the planets are more likely to be inhabited, than if they did not resemble the earth at all. This non-assignable and generally small increase of probability, beyond what would otherwise exist, is all the evidence which a conclusion can derive from analogy. For if we have [f] the slightest reason to suppose any real connexion between the two properties A and B, the argument is no longer one of analogy. If it had been ascertained ([g]I[g] purposely put an absurd supposition) that there was [h]a[h] connexion by causation between the fact of revolving [i]on[i] an axis and the existence of animated beings, or if there were any reasonable ground for even suspecting such a connexion, a probability would arise of the existence of inhabitants in the planets, which might be of any degree of strength, up to a complete induction; but we should

[n-n]MS, 43, 46 very
[a-a]+43, 46, 51, 56, 62, 65, 68, 72
[b-b]+51, 56, 62, 65, 68, 72
[c-c]+46, 51, 56, 62, 65, 68, 72
[d-d]+72
[e]MS, 43, 46, 51, 56 even
[f]MS, 43, 46 any
[g-g]MS we
[h-h]MS, 43, 46 any
[i-i]MS, 43 round

then infer the fact from the ascertained or [j]presumed[j] law of causation, and not from the analogy of the earth.

The name analogy, however, is sometimes employed by extension to denote those arguments of an inductive character but not amounting to a real induction, which are employed to strengthen the argument drawn from a simple resemblance. Though A, the property common to the two cases, cannot be shown to be the cause or effect of B, the analogical reasoner will endeavour [k] to show that there is some less close degree of connexion between them; that A is one of a set of conditions from which, when all united, B would result; or is an occasional effect of some cause which has been known also to produce B; and the like. Any of which things, if shown, would render the existence of B by so much more probable, than if there had not been even that amount of known connexion between B and A.

Now an error or fallacy of analogy may occur in two ways. Sometimes it consists in employing an argument of either of the above kinds with correctness indeed, but overrating its probative force. This very common aberration is sometimes supposed to be particularly incident to persons distinguished for their imagination; but in reality it is the characteristic intellectual vice of those whose imaginations are barren, either from want of exercise, natural defect, or the narrowness of their range of ideas. To such minds objects present themselves clothed in but few properties; and as, therefore, few analogies between one object and another occur to them, they almost invariably overrate the degree of importance of those few: while [l]one[l] whose fancy takes a wider range, perceives and remembers so many analogies tending to conflicting conclusions, that he is [m]much less[m] likely to lay undue stress on any of them. We always find that those are the greatest slaves to metaphorical language, who have but one set of metaphors.

But this is only one of the modes of error in the employment of arguments of analogy. There is another, more properly deserving the name of fallacy; namely, when resemblance in one point is inferred from resemblance in another point, though there is not only no evidence to connect the two circumstances by way of causation, but the evidence tends positively to disconnect them. This is properly the Fallacy of False Analogies.

As a first instance, we may cite that favourite argument in defence of absolute power, drawn from the analogy of paternal government in a family, which government [n], however much in need of control, is not and cannot be

[j-j]MS suspected
[k]MS, 43 , if he can,
[l-l]MS he
[m-m]MS, 43, 46, 51, 56, 62, 65 not so
[n-n796]MS, 43, 46 is not, and by universal admission ought not to be, controlled *by* (though it sometimes ought to be controlled *for*) the children. Paternal government, in a family, works well; therefore, says the argument

controlled by the children themselves, while they remain children. Paternal government, says the argument, works well; therefore[n], despotic government in a state will work well [o]. I wave, as not pertinent in this place, all that could be said in [p]qualification[p] of the alleged excellence of paternal government. However this might be, the argument from the family to the state would not the less proceed on a false analogy; implying[o] that the beneficial working of parental government depends, in the family, on the only point which it has in common with political despotism, namely, irresponsibility. Whereas it [q]depends, when real, not on that but on two other circumstances of the case[q], the affection of the parent for the children, and [r]the superiority of the parent[r] in wisdom and experience; neither of which properties can be reckoned on, or are at all likely to exist, between a political despot and his subjects; and [s] when either of these circumstances fails even in the family, and the influence of the irresponsibility is allowed to work uncorrected, the result is anything but good government. This, therefore, is a false analogy.

Another example is the not uncommon *dictum*, that bodies politic have youth, maturity, old age, and death, like bodies natural: that after a certain duration of prosperity, they tend spontaneously to decay. This also is a false analogy, because the decay of the vital powers in an animated body can be distinctly traced to the natural progress of those very changes of structure which, in their earlier stages, constitute its growth to maturity: while in the body politic the progress of those changes cannot, generally speaking, have any effect but the still further continuance of growth: it is the stoppage of that progress, and the commencement of retrogression, that alone would constitute decay. Bodies politic die, but it is of disease, or violent death: they have no old age.

The following sentence from Hooker's *Ecclesiastical Polity* is an instance of a false analogy from physical bodies to what are called bodies politic. "As there could be in natural bodies no motion of anything unless there were some which moveth all things, and continueth immovable: even so in politic societies there must be some unpunishable, or else no man shall suffer punishment."[*] There is a double fallacy here, for not only the analogy, but the premise from which it is drawn, is untenable. The notion that there must be something immovable which moves all [t]other things[t], is the old scholastic error of a *primum mobile*.

[*Bk. VIII, Chap. ix, sect. 1.]

[o-o]MS, 43, 46 : implying
[p-p]51 contradiction
[q-q]MS, 43, 46 does not depend upon that, but upon two other attributes of parental government
[r-r]MS his superiority to them
[s]MS that
[t-t]MS, 43 others

^u^The following instance ^v^I quote^v^ from Archbishop Whately's *Rhetoric*:

It would be admitted that a great and permanent diminution in the quantity of some useful commodity, such as corn, or coal, or iron, throughout the world, would be a serious and lasting loss; and again, that if the fields and coal mines yielded regularly double quantities, with the same labour, we should be so much the richer; hence it might be inferred, that if the quantity of gold and silver in the world were diminished one-half, or were doubled, like results would follow; the utility of these metals, for the purposes of coin, being very great. Now there are many points of resemblance and many of difference, between the precious metals on the one hand, and corn, coal, &c., on the other; but the important circumstance to the supposed argument is, that the *utility* of gold and silver (as coin, which is far the chief) *depends on their value*, which is regulated by their scarcity; or rather, to speak strictly, by the difficulty of obtaining them; whereas, if corn and coal were ten times as abundant (*i.e.* more easily obtained), a bushel of either would still be as useful as now. But if it were twice as easy to procure gold as it is, a sovereign would be twice as large; if only half as easy it would be of the size of a half-sovereign, and this (besides the trifling circumstance of the cheapness or dearness of gold ornaments) would be all the difference. The analogy, therefore, fails in the point essential to the argument. [*]

The same author notices, after Bishop Copleston, the case of False Analogy which consists in inferring from the similarity in many respects between the metropolis of a country and the heart of the animal body, that the increased size of the metropolis is a disease.^u^[†]

Some of the false analogies on which systems of physics were confidently grounded in the time of the Greek philosophers, are such as we now call fanciful, not that the resemblances are not often real, but that it is long since any one has been inclined to draw from them the inferences which were then drawn. Such, for instance, are the curious speculations of the Pythagoreans on the subject of numbers. Finding that the distances of the planets bore or seemed to bear to one another a proportion not varying much from that of the divisions of the monochord, they inferred from it the existence of an inaudible music, that of the spheres: as if the music of a harp had depended solely on the numerical proportions, and not on the material, nor even on the existence of any material, any strings at all. It has been similarly imagined that certain combinations of numbers, which were found to prevail in some natural phenomena, must run through the whole of nature: as that there must be four elements, because there are four possible combinations of hot and cold, wet and dry:[‡] that there must be seven planets, because there were

[*Richard Whately. *Elements of Rhetoric*. 5th ed. London: Fellowes, 1836, pp. 84–5.]

[†*Ibid.*, pp. 82n–83n.]

[‡Whewell, *History of the Inductive Sciences*, 1st ed., Vol. I, p. 47 (in MS JSM cancelled a note giving this reference).]

^u-u^+51, 56, 62, 65, 68, 72 ^v-v^51, 56, 62 is

seven metals, and even because there were seven days of the week. Kepler himself thought that there could be only six planets because there were only five regular solids. With these we may class the reasonings, so common in the speculations of the ancients, founded on a supposed *perfection* in nature: meaning by nature the customary order of events as they take place of themselves without human interference. This also is a rude guess at an analogy supposed to pervade all phenomena, however dissimilar. Since what was thought to be perfection appeared to obtain in some phenomena, it was inferred [w](in opposition to the plainest evidence)[w] to obtain in all. "We always suppose that which is better to take place in nature, if it be possible," says Aristotle:[*] and the vaguest and most heterogeneous qualities being confounded together under the notion of being *better*, there was no limit to the wildness of the inferences. Thus, because the heavenly bodies were "perfect," they must move in circles and uniformly. For "they" (the Pythagoreans) "would not allow," says Geminus,* "of any such disorder among divine and eternal things, as that they should sometimes move quicker and sometimes slower, and sometimes stand still; for no one would tolerate such anomaly in the movements even of a man, who was decent and orderly. The occasions of life, however, are often reasons for men going quicker or slower; but in the incorruptible nature of the stars, it is not possible than any cause can be alleged of quickness or slowness." It is seeking an argument of analogy very far, to suppose that the stars must observe the rules of decorum in gait and carriage, prescribed for themselves by the long-bearded philosophers satirized by Lucian.

As late as the Copernican controversy it was urged as an argument in favour of the true theory of the solar system, that [x]it placed the fire, the noblest element, in the centre of the universe.[x] This was a remnant of the notion that the order of nature must be perfect, and that perfection consisted in conformity to rules of precedency in dignity, either real or conventional. Again, reverting to numbers: certain numbers were *perfect*, therefore those numbers must obtain in the great phenomena of nature. Six was a perfect number, that is, equal to the sum of all its factors; an additional reason why there must be exactly six planets. The Pythagoreans, on the other hand, attributed perfection to the number ten; but agreed in thinking that the perfect number must be somehow realized in the heavens; and knowing only of nine heavenly bodies, to make up the enumeration, they asserted "that there was an *antichthon* or counter-earth, on the other side of the sun, in-

[*See *De Coelo*, Bk. II, Chap. v. (288[a] 3ff.)]

*I quote from Dr. Whewell's *History of the Inductive Sciences*, 3rd ed. [3 vols. London: Parker, 1857,] Vol. I, p. 129.

[w–w]+51, 56, 62, 65, 68, 72

[x–x]MS, 43, 46, 51, 56 "it . . . universe."* [*footnote:*] *Whewell, *History of the Inductive Sciences* [1st ed.], Vol. I, p. 365.

visible to us."* Even Huygens was persuaded that when the number of the heavenly bodies had reached twelve, it could not admit of any further increase. Creative power could not go beyond that sacred number.

Some curious instances of false analogy are to be found in the arguments of the Stoics to prove the equality of all crimes, and the equal wretchedness of all who had not realized their idea of perfect virtue. Cicero, towards the end of his Fourth Book *De Finibus*, states some of these as follows. "Ut, inquit, in fidibus plurimis, si nulla earum ita contenta numeris sit, ut concentum servare possit, omnes æque incontentæ [v]sunt[v]; sic peccata, quia discrepant, æque discrepant; paria sunt igitur." To which Cicero himself aptly answers, "æque contingit omnibus fidibus, ut incontentæ sint; illud non continuo, ut æque incontentæ." The Stoic resumes: "Ut enim, inquit, gubernator æque peccat, si palearum navem evertit, et si auri; item æque peccat qui parentem, et qui servum, injuriâ verberat;" assuming, that because the magnitude of the interest at stake makes no difference in the mere defect of skill, it can make none in the moral defect: a false analogy. Again, "Quis ignorat, si plures ex alto emergere velint, propius fore eos quidem ad respirandum, qui ad summam jam aquam appropinquant, sed nihilo magis respirare posse, quam eos, qui sunt in profundo? Nihil ergo adjuvat procedere, et progredi in virtute, quominus miserrimus sit, antequam ad eam pervenerit, quoniam in aquâ nihil adjuvat: et quoniam catuli, qui jam despecturi sunt, cæci æque, et ii qui modo nati; Platonem quoque necesse est, quoniam nondum videbat sapientiam, æque cæcum animo, ac Phalarim fuisse." Cicero, in his own person, combats these false analogies by other analogies tending to an opposite conclusion. "Ista similia non sunt, Cato. . . . Illa sunt similia; hebes acies est cuipiam oculorum: corpore alius languescit: hi curatione adhibitâ levantur in dies: alter valet plus quotidie: alter videt. Hi similes sunt omnibus, qui virtuti student; levantur vitiis, levantur erroribus."[*]

§ 7. [*Function of metaphors in reasoning*] In these and all other arguments drawn from remote analogies, and from metaphors, which are cases of analogy, it is apparent (especially when we consider the extreme facility of raising up contrary analogies and conflicting metaphors) that so far from the metaphor or analogy proving anything, the applicability of the metaphor is the very thing to be made out. It has to be shown that in the two cases asserted to be analogous, the same law is really operating; that between the known resemblance and the inferred one there is some connexion by means of causation. Cicero and Cato might have bandied opposite analogies for

Ibid., 52.

[*De finibus*, ed. Rackham, p. 382 (Bk. IV, Chap. xxvii); p. 370 (Bk. IV, Chap. xxiii); pp. 370–1 (Bk. IV, Chap. xxiv).]

[v-v]MS, 43, 46, 51, 56 sint [*sic*]

ever; it rested with each of them to prove by just induction, or at least to render probable, that the case resembled the one set of analogous cases and not the other, in the circumstances on which the disputed question really hinged. Metaphors, for the most part, therefore, assume the proposition which they are brought to prove: their use is, to aid the apprehension of it; to make clearly and vividly comprehended what it is that the person who employs the metaphor is proposing to make out; and sometimes also, by what media he proposes to do so. For an apt metaphor, though it cannot prove, often suggests the proof.

For instance, when [a]D'Alembert (I believe) remarked that in certain governments, only two [b]creatures[b] find their way to the highest places, the eagle and the serpent; the metaphor not only conveys with great vividness the assertion intended, but contributes towards substantiating it, by suggesting, in a lively manner, the means by which the two opposite characters thus typified effect their rise. When it is said that a certain person misunderstands another because the lesser of two objects cannot comprehend the greater, the application of what is true in the literal sense of the word *comprehend*, to its metaphorical sense, points to the fact which is the ground and justification of the assertion, viz., that one mind cannot thoroughly understand another unless it can contain it in itself, that is, unless it possesses all that is contained in the other. When it is urged as an argument for education, that if the soil is left uncultivated, weeds will spring up, the metaphor, though no proof, but a statement of the thing to be proved, states it in terms which, by suggesting a parallel case, put the mind upon the track of the real proof. For, the reason

[a-a]MS, 43 Mr. Carlyle, ["Corn Law Rhymes," *Edinburgh Review*, LV (July, 1832), p. 351,] rebuking the Byronic vein, says that "strength does not manifest itself in spasms, but in stout bearing of burdens;" the metaphor proves nothing, it is no argument, only an allusion to an argument; in no other way however could so much of argument be so completely suggested in so few words. In fact, this admirable expression suggests a whole train of reasoning, which it would take many sentences to write out at length. As thus: Motions which are violent but brief, which lead to no end, and are not under the control of the will, are, in the physical body, more incident to a weak than to a strong constitution. If this be owing to a cause which equally operates in what relates to the mind, the same conclusion will hold there likewise. But such is really the fact. For the body's liability to these sudden and uncontrollable motions arises from irritability, that is, unusual susceptibility of being moved out of its ordinary course by transient influences: which may equally be said of the mind. And this susceptibility, whether of mind or body, must arise from a weakness of the forces which maintain and carry on the ordinary action of the system. All this is conveyed in Mr. Carlyle's short sentence. And since the causes are alike in the body and in the mind, the analogy is a just one, and the maxim holds of the one as much as of the other.

Thus we see that the metaphor, although no proof but a statement of the thing to be proved, states it in terms which, by suggesting a parallel case, put the mind upon the track of the real proof. The hearer says, "Strength does not manifest itself in spasms,—very true; and for what reason?" Then in discovering the reason, he finds it precisely as applicable to the mind as it is to the body. This mode, therefore,] 46 *as* MS . . . few words. The expression suggests . . . *as* MS . . . conveyed in one short . . . *as* MS

[b-b]51, 56 animals

why weeds grow in an uncultivated soil, is that the seeds of worthless products exist everywhere, and can germinate and grow in almost all circumstances, while the reverse is the case with those which are valuable; and this being equally true of mental products, this mode[a] of conveying an argument, independently of its rhetorical advantages, has a logical value; since it not only suggests the grounds of the conclusion, but points [c]to[c] another case in which those grounds have been found, or at least deemed to be, sufficient.

On the other hand, when Bacon, who is equally conspicuous in the use and abuse of figurative illustration, says that the stream of time has brought down to us only the least valuable part of the writings of the ancients, as a river carries froth and straws floating on its surface, while more weighty objects sink to the bottom;[*] this, even if the assertion illustrated by it were true, would be no good illustration, there being no parity of cause. The levity by which substances float on a stream, and the levity which is synonymous with worthlessness, have nothing in common except the name; and (to show how little value there is in the metaphor) we need only change the word into *buoyancy*, to turn the semblance of argument involved in Bacon's illustration [d] against himself.

A metaphor, then, is not to be considered as an argument, but as an assertion that an argument exists; that a parity subsists between the case from which the metaphor is drawn and that to which it is applied. This parity may exist though the two cases [e] be apparently very remote from one another; the only resemblance existing between them may be a resemblance of relations, an analogy in Ferguson's[†] and Archbishop Whately's sense [f]: as in the preceding instance, in which an illustration from agriculture was applied to mental cultivation.[f]

§ 8. [*How fallacies of generalization grow out of bad classification*] To terminate the subject of Fallacies of [a] Generalization, it remains to be said,

[*"Of the Interpretation of Nature," *Works*, Vol. III, p. 227; *cf.* "Filum Labyrinth," *ibid.*, p. 503.]

[†See Adam Ferguson. *Principles of Moral and Political Science.* 2 vols. Edinburgh: Creech, 1792, Vol. I, p. 107; Whately, *Elements of Logic*, p. 186 (Bk. III, §10).]

[c-c]MS, 43, 46 out [d]MS, 43, 46, 51, 56, 62, 65 directly [e]MS may

[f-f]MS, 43, 46 . As in the instance quoted from Mr. Carlyle: there is no resemblance between convulsions of the body and fits of passion in the mind, considered in themselves; the resemblance is between the relation which convulsions of the body bear to its ordinary motions, and that which fits of passion in the mind bear to its steadier feelings. Thus, where the real difference between the two cases is the widest; where the metaphor seems the most far-fetched, the analogy the most remote; and where, consequently, a limited and literal understanding would be most apt to shut itself up within its intrenchment of prose, and refuse admittance to the metaphor, under an idea that cases so very unlike can throw no light upon each other; it is often in those very cases that the argument which the metaphor involves and suggests is the most conclusive.

[a]MS Bad

that the most fertile source of them is bad classification: bringing together in one group, and under one name, things which have no common properties, or none but such as are too unimportant to allow general propositions of any considerable value to be made respecting the class. The misleading effect is greatest, when a word which in common use expresses some definite fact, is extended by slight links of connexion to cases in which that fact does not exist, but some other or others, only slightly resembling it. Thus Bacon,* in speaking of the *Idola* or Fallacies arising from notions *temere et inæqualiter à rebus abstractæ*, exemplifies them by the notion of Humidum or Wet, so familiar in the physics of antiquity and of the middle ages.

Invenietur verbum istud, Humidum, nihil aliud quam nota confusa diversarum actionum, quæ nullam constantiam aut reductionem patiuntur. Significat enim, et quod circa aliud corpus facile se circumfundit; et quod in se est indeterminabile, nec consistere potest; et quod facile cedit undique; et quod facile se dividit et dispergit; et quod facile se unit et colligit; et quod facile fluit, et in motu ponitur; et quod alteri corpori facile adhæret, idque madefacit; et quod facile reducitur in liquidum, sive colliquatur, cum antea consisteret. Itaque quum ad hujus nominis prædicationem et impositionem ventum sit; si alia accipias, flamma humida est; si alia accipias, aer humidus non est; si alia, pulvis minutus humidus est; si alia, vitrum humidum est: ut facile appareat, istam notionem ex aquâ tantum, et communibus et vulgaribus liquoribus, absque ullâ debitâ verificatione, temere abstractam esse.

Bacon himself is not exempt from a similar accusation when inquiring into the nature of heat: where he occasionally proceeds like one who seeking for the cause of hardness, after examining that quality in iron, flint, and diamond, should expect to find that it is something which can be traced also in hard water, a hard knot, and a hard heart.

The word κίνησις in the Greek philosophy, and the words Generation and Corruption both then and long afterwards, denoted such a multitude of heterogeneous phenomena, that any attempt at philosophizing in which those words were used was almost as necessarily abortive as if the word *hard* had been taken to denote a class including all the things mentioned above. Κίνησις, for instance, which properly signified motion, was taken to denote not only all motion but even all change: ἀλλοίωσις being recognised as one of the modes of κίνησις. The effect was, to connect with every form of ἀλλοίωσις or change, ideas drawn from motion in the proper and literal sense, and which had no real connexion with any other kind of κίνησις than that. Aristotle and Plato laboured under a continual embarrassment from this misuse of terms. But if we proceed further in this direction we shall encroach upon the Fallacy of Ambiguity, which belongs to a different class, the last in order of our classification, Fallacies of Confusion.

*Novum Organum, [Bk. I,] Aph. 60 [pp. 171–2].

CHAPTER VI

Fallacies of [a]Ratiocination

§ 1. [*Introductory remarks*] We have now, in our progress through the classes of Fallacies, arrived at those to which, in the common books of logic, the appellation is in general exclusively appropriated; those which have their seat in the ratiocinative or deductive part of the investigation of truth. On these fallacies it is the less necessary for us to insist at any length, as they have been [b]most satisfactorily[b] treated in a work familiar to almost all, in this country at least, who feel any interest in these speculations, Archbishop Whately's *Logic*. Against the more obvious forms of this class of fallacies, the rules of the syllogism are a complete protection. Not (as we have so often said) that [c] ratiocination cannot be good unless it be in the form of a syllogism; but that, by [d]showing it in[d] that form, we are sure to discover if it be bad, or at least if it contain any fallacy of this class.

§ 2. [*Fallacies in the conversion and æquipollency of propositions*] Among Fallacies of Ratiocination, we ought perhaps to include the errors committed in processes which have the appearance only, not the reality, of an inference from premises; the fallacies connected with the conversion and æquipollency of propositions. I believe errors of this description to be far more frequently committed than is generally supposed, or than their extreme obviousness might seem to admit of. For example, the simple conversion of an universal affirmative proposition, All A are B, therefore all B are A, I take to be a very common form of error: though committed, like many other fallacies, oftener in the silence of thought than in express words, for it can scarcely be clearly enunciated without being detected. And so with another form of fallacy, not substantially different from the preceding: the erroneous conversion of an hypothetical proposition. The proper converse of an hypothetical proposition is this: If the consequent be false, the antecedent is false; but this, If the consequent be true, the antecedent is true, by no means holds good, but is an error corresponding to the simple conversion of an universal

[a]MS Bad
[b-b]MS, 43 so admirably
[c]MS, 43, 46, 51, 56, 62, 65, 68 the
[d-d]MS throwing it into [*printer's error?*]

affirmative. Yet hardly anything is more common than for people, in their private thoughts, to draw this inference. As when the conclusion is accepted, which it so often is, for proof of the premises. That the premises cannot be true if the conclusion is false, is the unexceptionable foundation of the legitimate mode of reasoning called [a] *reductio ad absurdum*. But [b]people[b] continually think and express themselves, as if they also believed that the premises cannot be false if the conclusion is true. The truth, or supposed truth, of the inferences which follow from a doctrine, [c]often[c] enables it to find acceptance in spite of gross absurdities in it. How many [d]philosophical systems[d] which had scarcely any intrinsic recommendation, have been received by thoughtful men because they were supposed to lend additional support to religion, morality, some favourite view of politics, or some other cherished persuasion: not merely because their wishes were thereby enlisted on its side, but because its leading to what they deemed sound conclusions appeared to them a strong presumption in favour of its truth: though the presumption, when viewed in its true light, amounted only to the absence of that particular [e] evidence of falsehood, which would have resulted from its leading by correct inference to something already [f]known to be[f] false.

Again, the very frequent error in conduct, of mistaking reverse of wrong for right, is the practical form of a logical error with respect to the Opposition of Propositions. It is committed for want of the habit of distinguishing the *contrary* of a proposition from the *contradictory* of it, and of attending to the logical canon, that contrary propositions, though they cannot both be true, may both be false. If the error were to express itself in words, it would run distinctly counter to this canon. It generally, however, does not so express itself, and to compel it to do so is the [g]most effectual[g] method of detecting and exposing it.

§ 3. [*Fallacies in the syllogistic process*] Among Fallacies of Ratiocination are to be ranked in the first place, all the cases of vicious syllogism laid down in the books. These generally resolve themselves into having more than three terms to the syllogism, either avowedly, or in the covert mode of an undistributed middle term, or an *illicit process* of one of the two extremes. It is not, indeed, very easy fully to convict an argument of falling under any one of these vicious cases in particular; for the reason already [a]more than once referred to[a], that the premises are seldom formally set out: if they were, the fallacy would impose upon nobody; and while they are not, it is almost

[a]MS, 43, 46, 51, 56, 62, 65, 68 a
[b–b]MS, 43, 46 men
[c–c]MS is often what
[d–d]MS, 43, 46 systems of philosophy,
[e]MS, 43, 46 kind of
[f–f]MS, 43, 46, 51, 56, 62, 65 recognised as
[g–g]MS true
[a–a]MS, 43 quoted from Archbishop Whately

always to a certain degree optional in what manner the suppressed link shall be filled up. The rules of the syllogism are rules for compelling a person to be aware of the whole of what he must undertake to defend if he persists in maintaining his conclusion. He has it [b]almost[b] always in his power to make his syllogism good by introducing a false premise; and hence it is scarcely ever possible decidedly to affirm that any argument involves a bad syllogism: but this detracts nothing from the value of the syllogistic rules, since it is by them that a reasoner is compelled distinctly to make his election what premises he is prepared to maintain. The election made, there is generally so little difficulty in seeing whether the conclusion follows from the premises set out, that we might without much logical impropriety have merged this fourth class of fallacies in the fifth, or Fallacies of Confusion.

§ 4. [*Fallacy of changing the premises*] Perhaps, however, the commonest, and certainly the most dangerous fallacies of this class, are those which do not lie in a single syllogism, but slip in between one syllogism and another in a chain of argument, and are committed by *changing the premises.* A proposition is proved, or an acknowledged truth laid down, in the first part of an argumentation, and in the second a further argument is founded not on the same proposition, but on some other, resembling it sufficiently to be mistaken for it. Instances of this fallacy will be found in almost all the argumentative discourses of unprecise thinkers; and we need only here advert to one of the obscurer forms of it, recognised by the schoolmen as the fallacy *à dicto secundum quid ad dictum simpliciter*. This is [a]committed[a] when, in the premises, a proposition is asserted with a qualification, and the qualification lost sight of in the conclusion; or oftener, when a limitation or condition, though not asserted, is necessary to the truth of the proposition, but is forgotten when that proposition comes to be employed as a premise. Many of the bad arguments in vogue belong to this class of error. The premise is some admitted truth, some common maxim, the reasons or evidence for which have been forgotten, or are not thought of at the time, but if they had been thought of would have shown the necessity of so limiting the premise that it would no longer have supported the conclusion drawn from it.

Of this nature is the fallacy in what is called, by Adam Smith and others, the Mercantile Theory [b]in[b] Political Economy.[*] That theory sets out from the common maxim, that whatever brings in money enriches; or that every

[*See Adam Smith. *An Inquiry into the Nature and Causes of the Wealth of Nations*. Ed. E. G. Wakefield. 4 vols. London: Knight, 1835–9. Vol. III, pp. 70ff. (Bk. IV, Chap. i.)]

[b-b]+43, 46, 51, 56, 62, 65, 68, 72
[a-a]+43, 46, 51, 56, 62, 65, 68, 72
[b-b]MS of

one is rich in proportion to the quantity of money he obtains. From this it is concluded that the value of any branch of trade, or of the trade of the country altogether, consists in the balance of money it brings in; that any trade which carries more money out of the country than it draws into it is a losing trade; that therefore money should be attracted into the country and kept there, by prohibitions and bounties: and a train of similar corollaries. All for want of reflecting that if the riches of an individual are in proportion to the quantity of money he can command, it is because that is the measure of his power of purchasing money's worth; and is therefore subject to the proviso that he is not debarred from employing his money in such purchases. The premise, therefore, is only true *secundum quid*; but the theory assumes it to be true absolutely, and infers that increase of money is increase of riches, even when produced by means subversive of the condition under which alone money [c]can be[c] riches.

A second instance is, the argument by which it used to be contended, before the commutation of tithe, that tithes fell on the landlord, and were a deduction from rent; because the rent of tithe-free land was always higher than that of land of the same quality, and the same advantages of situation, subject to tithe. Whether it be true [d]or not that a tithe falls on rent[d], a treatise on Logic is not the place to examine; but it is certain that this is no proof of it. Whether the proposition be true or false, tithe-free land must, by the necessity of the case, pay a higher rent. For if tithes do not fall on rent, it must be because they fall on the consumer; because they raise the price of [e]agricultural produce. But if the produce[e] be raised [f]in price[f], the farmer of tithe-free as well as the farmer of tithed land gets the benefit. To the latter the rise is but a compensation for the tithe he pays; to the first, who pays none, it is clear gain, and therefore enables him, and if there be freedom of competition forces him, to pay so much [g] more rent to his landlord. [h] The question remains, to what class of fallacies [i]this[i] belongs. The premise is, that the owner of tithed land receives less rent than the owner of tithe-free land; the conclusion is, [j]that[j] therefore he receives less than he himself would receive if tithe were abolished. But the premise is only true conditionally; the owner of tithed land receives less than what the owner of tithe-free land is enabled to receive *when other lands are tithed*; while the conclusion is applied to a state of circumstances in which that condition fails, and in which,

[c–c]MS, 43, 46 is
[d–d]MS, 43, 46 that a tithe falls on rent or no
[e–e]MS, 43, 46 corn. But if corn
[f–f]+43, 46, 51, 56, 62, 65, 68, 72 [*slip of the pen?*]
[g]MS, 43, 46 the
[h]MS, 43 This is the refutation of the fallacy.
[i–i]MS, 43 it
[j–j]+43, 46, 51, 56, 62, 65, 68, 72

by consequence, the premise [k]will[k] not be true. The fallacy, therefore, is *à dicto secundum quid ad dictum simpliciter.*

A third example is the opposition sometimes made to legitimate interferences of government in the economical affairs of society, grounded on a misapplication of the maxim, that an individual is a better judge than the government, of what is for his own pecuniary interest. This objection was urged to Mr. Wakefield's [l]principle of colonization; [m] the[l] concentration of the settlers, by fixing such a price on unoccupied land as may preserve the most desirable proportion between the quantity of land in culture, and the labouring population. Against this it was argued, that if individuals found it for their advantage to occupy extensive tracts of land, they, being better judges of their own interest than the legislature (which can only proceed on general rules) ought not to be restrained from doing so. But in this argument it was forgotten that the fact of a [n]person's[n] taking a large tract of land is evidence only that it is his interest to take as much as other people, but not that it might not be for his interest to content himself with less, if he could be assured that other people would do so too; an assurance which nothing but a government regulation can give. If all other people took much, and he only a little, he would reap none of the advantages derived from the concentration of the population and the consequent possibility of procuring labour for hire, but would have placed himself, without equivalent, in a situation of voluntary inferiority. The proposition, therefore, that the quantity of land which people will take when left to themselves is that which [o] is most for their interest to take, is true only *secundum quid*: it is only their interest while they have no guarantee for the conduct of one another. But the argument disregards the limitation, and takes the proposition for true *simpliciter.*

One of the conditions oftenest dropped, when what would otherwise be a true proposition is employed as a premise for proving others, is the condition of *time*. It is a principle of political economy that prices, profits, wages, &c. "always find their level;" but this is often interpreted as if it meant that they are always, or generally, *at* their level; while the truth is, as Coleridge epigrammatically expresses it, that they are always *finding* their level, "which might be taken as a paraphrase or ironical definition of a storm."[*]

[*Second Lay Sermon*, in *On the Constitution of Church and State, and Lay Sermons*. London: Pickering, 1839, p. 403.]

[k-k]MS, 43, 46, 51, 56, 62, 65, 68 would

[l-l]MS, 43, 46 system of colonization, one of the greatest practical improvements in public affairs which have been made in our time. Mr. Wakefield's principle, as most people are now aware, is the artificial

[m]51, 56 that of

[n-n]MS, 43, 46 man's

[o]MS, 43, 46 it

Under the same head of fallacy (*à dicto secundum quid ad dictum simpliciter*) might be placed all the errors which are vulgarly called misapplications of abstract truths: that is, where a principle, true (as the common expression is) *in the abstract*, that is, all modifying causes being supposed absent, is reasoned on as if it were true absolutely, and no modifying [p]circumstance[p] could ever by possibility exist. This very common form of error it is not requisite that we should exemplify here, as it will be particularly treated of hereafter in its application to the subjects on which it is most frequent and most fatal, those of politics and society.*

*[51] "An advocate," says Mr. De Morgan (*Formal Logic*, p. 270) "is sometimes guilty of the argument *à dicto secundum quid ad dictum simpliciter*: it is his business to do for his client all that his client might *honestly* do for himself. Is not the word in italics frequently omitted? *Might* any man honestly try to do for himself all that counsel frequently try to do for him? We are often reminded of the two men who stole the leg of mutton; one could swear he had not got it, the other that he had not taken it. The counsel is doing his duty by his client, the client has left the matter to his counsel. Between the unexecuted intention of the client, and the unintended execution of the counsel, there may be a wrong done, and, if we are to believe the usual maxims, no wrong-doer."

The same writer justly remarks (p. 251) that there is a converse fallacy, *à dicto simpliciter ad dictum secundum quid*, called by the scholastic logicians *fallacia accidentis*; and another which [q]may[q] be called *à dicto secundum quid ad dictum secundum alterum quid* (p. 265). For apt instances of both, I must refer the reader to Mr. De Morgan's able chapter on Fallacies [pp. 237–86].

[p-p]MS, 43, 46, 51, 56 circumstances
[q-q]51 might

CHAPTER VII

Fallacies of Confusion

§ 1. [*Fallacy of Ambiguous Terms*] Under this fifth and last class [a]it is[a] convenient to arrange all those fallacies, in which the source of error is not so much a false estimate of the probative force of known evidence, as an indistinct, indefinite, and fluctuating conception of what the evidence is.

At the head of these stands that multitudinous body of fallacious reasonings, in which the source of error is the ambiguity of terms: when something which is true if a word be used in a particular sense, is reasoned on as if it were true in another sense. In such a case there is not a mal-estimation of evidence, because there is not properly any evidence to the point at all; there is evidence, but to a different point, which from a confused apprehension of the meaning of the terms used, is supposed to be the same. This error will naturally be oftener committed in our ratiocinations than in our direct inductions, because in the former we are deciphering our own or other people's notes, while in the latter we have the things themselves present, either to [b]the senses or to the[b] memory. Except, indeed, when the induction is not from individual cases to a generality, but from generalities to a still higher generalization; in that case the fallacy of ambiguity may affect the inductive process as well as the ratiocinative. It occurs in ratiocination in two ways: when the middle term is ambiguous, or when one of the terms of the syllogism is taken in one sense in the premises, and in another sense in the conclusion.

Some good exemplifications of this fallacy are given by Archbishop Whately.[*]

One case, [says he,] which may be regarded as coming under the head of Ambiguous Middle, is [c](what I believe logical writers mean by '*Fallacia Figuræ Dictionis*,')[c] the fallacy built on the grammatical structure of language, from men's usually taking for granted that *paronymous* [d](or *conjugate*) words, *i.e.* those belonging to each other, as the substantive, adjective, verb, &c., of the same root,[d] have a precisely [e]corresponding[e] meaning; which is by no means universally the

[**Elements of Logic*, 9th ed., pp. 177–9; 1st ed., pp. 157–61.]

[a–a]MS, 43, 46 we find it
[b–b]MS, 43, 46 our senses or to our
[c–c]Source [1st ed.], MS, 43, 46 what is called *Fallacia Figuræ Dictionis*,
[d–d]Source [1st ed.], MS, 43, 46 words (*i.e.* those . . . root)
[e–e]Source [1st and 9th eds.], MS, 43, 46, 51 correspondent

case. Such a fallacy could not indeed be even exhibited in strict logical form, which would preclude even the attempt at it, since it has two middleterms in sound as well as sense. But nothing is more common in practice than to vary continually the terms employed, with a view to grammatical convenience; nor is there anything unfair in such a practice, as long as the *meaning* is preserved unaltered; *e.g.* 'murder should be punished with death; this man is a murderer, therefore he deserves to die,' &c. Here we proceed on the assumption (in this case just) that to commit murder, and to be a murderer,—to deserve death, and to be one who ought to die, are, respectively, equivalent expressions; and it would frequently prove a heavy inconvenience to be debarred this kind of liberty; but the abuse of it gives rise to the Fallacy in question: e.g. *projectors* are unfit to be trusted; this man has formed a *project*, therefore he is unfit to be trusted: here the sophist proceeds on the hypothesis that he who forms a *project* must be a *projector*: whereas the bad sense that commonly attaches to the latter word, is not at all implied in the former. This fallacy may often be considered as lying not in the Middle, but in one of the terms of the Conclusion; so that the conclusion drawn shall not be, in reality, at all warranted by the premises, though it will appear to be so, by means of the grammatical affinity of the words: *e.g.* to be acquainted with the guilty is a *presumption* of guilt; this man is so acquainted, therefore we may *presume* that he is guilty: this argument proceeds on the supposition of an exact correspondence between *presume* and *presumption*, which, however, does not really exist; for 'presumption' is commonly used to express a kind of *slight suspicion*; whereas, 'to presume' amounts to [f]actual[f] belief. There are innumerable instances of a non-correspondence in paronymous words, similar to that above instanced; as between *art* and *artful*, *design* and *designing*, *faith* and *faithful*, &c.; and the more slight the variation of [g]the[g] meaning, the more likely is the fallacy to be successful; for when the words have become so widely removed in sense as 'pity' and 'pitiful,' every one would perceive such a fallacy, nor could it be employed but in jest.*

The present Fallacy [i] is nearly allied to, or rather, perhaps, may be regarded as a branch of, that founded on *etymology*; viz., when a term is used, at one time in its customary, and at another in its etymological sense. Perhaps no example of this can be found that is more extensively and mischievously employed than in the case of the word *representative*: assuming that its right meaning must correspond exactly with the strict and original sense of the verb 'represent,' the sophist persuades the multitude, that a member of the House of Commons is bound to be guided in all points by the opinion of his constituents; and, in short,

*An example of this fallacy is the popular error that *strong* drink must be a cause of *strength*. There is here fallacy within fallacy; for granting that the words "strong" and "strength" were not (as they are) applied in a totally different sense to fermented liquors and to the human body, there would still be involved the error of supposing that an effect must be like its cause; that the conditions of a phenomenon are likely to resemble the phenomenon itself; which we have already treated of as an *à priori* fallacy of the first rank. [h]As well might it be supposed that a strong poison will make the person who takes it, strong.[h] [JSM's footnote]

[f-f]Source [1st ed.], MS, 43, 46 absolute
[g-g]+56, 62, 65, 68, 72 [*not in* Source]
[h-h]+62, 65, 68, 72
[i]MS, 43 ," continues the Archbishop, "

to be merely their *spokesman*; whereas law and custom, which in this case may be considered as fixing the meaning of the term, require no such thing, but enjoin the representative to act according to the best of his *own* judgment, and on his own responsibility.

The following are instances of great practical importance, in which arguments are habitually founded on a verbal ambiguity.

The mercantile public are frequently led into this fallacy by the phrase, "scarcity of money." In the language of commerce "money" has two meanings: *currency*, or the circulating medium; and *capital seeking investment*, especially investment on loan. In this last sense the word is used when the "money market" is spoken of, and when the "value of money" is said to be high or low, the rate of interest being meant. The consequence of this ambiguity is, that as soon as scarcity of money in the latter of these senses begins to be felt,—as soon as there is difficulty of obtaining loans, and the rate of interest is high,—it is concluded that this must arise from causes acting upon the quantity of money in the other and more popular sense; that the circulating medium must have diminished in quantity, or ought to be increased. I am aware that, independently of the double meaning of the term, there are in [j]the facts[j] themselves some peculiarities, giving an apparent support to this error; but the ambiguity of the language stands on the very threshold of the subject, and intercepts all attempts to throw light upon it.

Another ambiguous expression which continually meets us in the political controversies of the present time, especially in those which relate to organic changes, is the phrase "influence of property:" which is sometimes used for the influence of respect for superior intelligence, or gratitude for the kind offices which persons of large property have it so much in their power to bestow; at other times for the influence of fear; fear of the worst sort of power, which large property [k]also[k] gives to its possessor, the power of doing mischief to dependents. To confound these two, is the standing fallacy of ambiguity brought against those who seek to purify [l]the[l] electoral system from corruption and intimidation. [m] Persuasive influence, acting through the conscience of the voter, and carrying his heart and mind with it, is beneficial —therefore [n](it is pretended)[n] coercive influence, which compels him to forget that he is a moral agent, or to act in opposition to his moral convictions, ought not to be placed under restraint.

[j-j]65, 68 facts *[printer's error?]*
[k-k]+43, 46, 51, 56, 62, 65, 68, 72
[l-l]MS, 43, 46 our
[m]MS, 43, 46 "The influence of property is beneficial:" granted, if the former species of influence and that alone be meant; but conclusions are thence drawn in condemnation of expedients which (like secret voting, for example,) would deprive property of some of its influences, though only of the latter and bad kind.
[n-n]MS, 43, 46 we are to infer that

Another word which is often turned into an instrument of the fallacy of ambiguity, is Theory. In its most proper acceptation, theory means the completed result of philosophical induction from experience. In that sense, there are erroneous as well as true theories, for induction may be incorrectly performed, but theory of some sort is the necessary result of knowing anything of a subject, and having put one's knowledge into the form of general propositions for the guidance of practice. [o]In this, the proper sense of the word, Theory is the explanation of practice.[o] In another and [p]a[p] more vulgar sense, theory means any mere fiction of the imagination, endeavouring to conceive how a thing may possibly have been produced, instead of examining how it was produced. In this sense only are theory, and theorists, unsafe guides; but because of this, ridicule or discredit is attempted to be attached to theory in its proper sense, that is, to legitimate generalization, the end and aim of all philosophy; and a conclusion is represented as worthless, just because that has been done, which if done correctly, constitutes the highest worth that a principle for the guidance of practice can possess, namely, to comprehend in a few words the real law on which a phenomenon depends, or some property or relation which is universally true of it.

"The Church" is sometimes understood to mean the clergy alone, sometimes the whole body of believers, or at least of communicants. The declamations respecting the inviolability of church property are indebted for the greater part of their apparent force to this ambiguity. The clergy, being called the church, are supposed to be the real owners of what is called church property; whereas they are in truth only the managing members of a much larger body of proprietors, and enjoy on their own part a mere usufruct, not extending beyond a life interest.

[q] The following is a Stoical argument taken from Cicero *De Finibus*, book the third: "Quod est bonum, omne laudabile est. Quod autem laudabile est,

[o-o]+51, 56, 62, 65, 68, 72 [p-p]+51, 56, 62, 65, 68, 72

[q]MS, 43, 46 The following is a favourite argument of Plato. No one desires evil, knowing it to be so: to do wrong is evil; therefore no one desires to do wrong knowing that which he desires, but only in consequence of ignorance. [See *Protagoras*, 345^{d-e}; in *The Dialogues of Plato*. Tr. Benjamin Jowett. 4 vols. Oxford: Clarendon Press, 1871, Vol. I, p. 172.] In this syllogism the ambiguous word is the middle term, Evil, the double meaning of which is too obvious to need explanation: yet on this foundation Plato constructs his principal ethical doctrine, in which he was followed by most of the philosophical sects among the later Greeks; that virtue is a branch of intelligence, and is to be produced, therefore, mainly by intellectual cultivation. All the inquiries into the *summum bonum* in the philosophical schools were infected with the same fallacy; the ambiguous word being, as before, Evil, or its contrary correlative, Good, which sometimes meant what is good for oneself, at other times what is good for other people. That nothing which is a cause of evil on the whole to other people, can be really good for the agent himself, is indeed a possible tenet, and always a favourite one with moralists, although in the present age the question has rather been, not whether the proposition is true, but how society and education can be so ordered as to make it true. At all events, it is not proved merely by the fact that a thing beneficial to the world, and a thing bene-

omne honestum est. Bonum igitur quod est, honestum est."[*] Here the ambiguous word is *laudabile*, which in the minor premise means anything which mankind are accustomed, on good grounds, to admire or value; as beauty, for instance, or good fortune: but in the major, it denotes exclusively moral qualities. In much the same manner the Stoics [r]endeavoured logically to justify as philosophical truths, their figurative and rhetorical expressions of ethical sentiment:[r] as that the virtuous man is alone free, alone beautiful, alone a king, &c. Whoever has virtue has Good (because it has been previously determined not to call anything else good); but, again, Good necessarily includes freedom, beauty, and even [s]kingship[s], all [t] these being good things; therefore whoever has virtue has all these.

The following is an argument of Descartes to prove, in his *à priori* manner, the being of [u]a[u] God. The conception, says he, of an infinite Being proves the real existence of such a being. For if there is not really any such being, *I* must have made the conception; but if I could make it, I can also unmake it; which evidently is not true; therefore there must be, externally to myself, an archetype, from which the conception was derived. [v]In this argument (which, it may be observed, would equally prove the real existence of ghosts and of witches) the ambiguity[v] is in the pronoun *I*, by which, in one place, is to be understood my *will*, in another the *laws of my nature*. If the conception, existing as it does in my mind, had no original without, the conclusion would unquestionably follow that *I* made it; that is, the laws of my nature must have [w]somehow[w] evolved it: but that my *will* made it, would not follow. Now when Descartes afterwards adds that I cannot unmake the conception, he means that I cannot get rid of it by an act of my will: which is true, but is not the proposition required. [x]I can as much unmake this conception as I can any other: no conception which I have once had, can I ever dismiss by [y] mere volition: but[x] what some of the laws of my nature have produced, other laws, or those same laws in other circumstances, [z]may, and often do, subsequently efface[z].

[*Ed. Rackham, p. 244 (Bk. III, Chap. viii).]

ficial to a person himself, are both in common parlance called *good*. That is no valid argument, but a fallacy of ambiguity.

Of such stuff, however, were the ethical speculations of the ancients principally composed, especially in the declining period of the Greek philosophical mind.

[r-r]MS, 43, 46 were led to all their absurdest paradoxes;
[s-s]MS, 43 royalty [t]MS, 43, 46, 51 of
[u-u]+51, 56, 62, 65, 68, 72
[v-v]MS, 43, 46 The ambiguity in this case
[w-w]MS, 43, 46, 51, 56, 62, 65 spontaneously
[x-x]MS, 43, 46 That
[y]51, 56, 62 a
[z-z]MS, 43, 46 might not subsequently efface, he would have found it difficult to establish

Analogous to this are some of the ambiguities in the free-will controversy; which, as they will come under special consideration in the concluding Book, I only mention *memoriæ causâ*. In that discussion, too, the word *I* is often shifted from one meaning to another, at one time standing for my volitions, at another time for the actions which are the consequences of them, or the mental dispositions from which they proceed. The latter ambiguity is exemplified in an argument of Coleridge (in his *Aids to Reflection*), in support of the freedom of the will. It is not true, he says, that [a]a[a] man is governed by motives; "the man makes the motive, not the motive the man;" the proof being that "what is a strong motive to one man is no motive at all to another."[*] The premise is true, but only amounts to this, that different persons have different degrees of susceptibility to the same motive; as they have also to the same intoxicating [b]liquid[b], which however does not prove that they are free to be drunk or not drunk, whatever [c]quantity of the fluid[c] they may drink. What is proved is, that certain mental conditions in the [d]person[d] himself, must co-operate, in the production of the act, with the external inducement: but those mental conditions also are the effect of causes; and there is nothing in the argument to prove that they can arise without a cause—that a spontaneous determination of the [e] will, without any cause at all, ever takes place, as the free-will doctrine supposes.

The double use, in the free-will controversy, of the word Necessity, which sometimes stands only for Certainty, at other times for Compulsion; sometimes for what *cannot* be prevented, at other times only for what we have reason to be assured *will* not; [f]we shall have occasion hereafter to pursue[f] to some of its ulterior consequences.

A most important ambiguity, both in common and in metaphysical language, is thus pointed out by Archbishop Whately in the Appendix to his *Logic*:[†]

Same (as well as *One*, *Identical*, and other words derived from them,) is used frequently in a sense very different from its primary one, as applicable to a *single* object; being employed to denote great *similarity*. When several objects are undistinguishably alike, *one single description* will apply equally to any of them; and thence they are said to be all of *one and the same* nature, appearance, &c. As, *e.g.* when we say 'this house is built of the *same* stone with such another,' we only mean that the stones are undistinguishable in their qualities; not that the one

[*2nd ed. London: Hurst, Chance, 1831, p. 59.]
[†9th ed., pp. 339–40; 1st ed., pp. 298–9.]

[a-a]+65, 68, 72
[b-b]MS liquor [*printer's error? see next variant*]
[c-c]MS quantity of liquor] 43, 46, 51, 56, 62, 65 quantity
[d-d]MS, 43, 46 man
[e]MS, 43, 46 man's
[f-f]MS, 43 has been pointed out by Archbishop Whately [*Elements of Logic*, pp. 317–21], and we . . . pursue it

building was pulled down, and the other constructed with the materials. Whereas *sameness*, in the primary sense, does not even necessarily imply similarity; for if we say of any man that he is greatly altered since such a time, we understand, and indeed imply by the very expression, that he is *one person*, though different in several qualities. It is worth observing also, that Same, in the secondary sense, admits, according to popular usage, of degrees: we speak of two things being *nearly* the same, but not entirely: personal identity does not admit of degrees. Nothing, perhaps, has contributed more to the error of Realism than inattention to this ambiguity. When several persons are said to have *one and the same* opinion, thought, or idea, [g]many[g] men, overlooking the true simple statement of the case, which is, that they are *all thinking alike*, look for something more abstruse and mystical, and imagine there must be some *One Thing*, in the primary sense, though not an individual, which is present at once in the mind of each of these persons; and thence readily sprung Plato's theory of Ideas, each of which was, according to him, one real, eternal object, existing entire and complete in each of the individual objects that are known by one name.

It is, indeed, not a matter of inference, but of authentic history, that Plato's doctrine of Ideas, and the Aristotelian doctrine ([h]in this respect similar to[h] the Platonic) of substantial forms and second substances, grew up in the precise way here pointed out; from the supposed necessity of finding, in things which were said to have the *same* nature, or the *same* qualities, something which was the *same* in the very sense in which a man is the same as himself. All the idle speculations respecting τὸ ὄν, τὸ ἕν, τὸ ὅμοιον, and similar abstractions, so common in the ancient and in some modern schools of [i]thought, sprang[i] from the same source. The Aristotelian logicians [j]saw, however,[j] one case of the ambiguity, and provided against it with their peculiar felicity in the invention of technical language, when they distinguished things which differed both *specie* and *numero*, from those which differed *numero tantum*, that is, which were exactly alike (in some particular respect at least) but were distinct individuals. An extension of this distinction to the two meanings of the word Same, namely, things which are the same *specie tantum*, and a thing which is the same *numero* as well as *specie*, would have prevented the confusion which has been a source of so much darkness and such an abundance of positive error in [k]metaphysical[k] philosophy.

One of the most singular examples of the length to which a [l]thinker[l] of eminence may be led away by an ambiguity of language, is afforded by this very case. I refer to the famous argument by which Bishop Berkeley flattered himself that he had for ever put an end to "scepticism, atheism, and irreligion."[*] It is briefly as follows. I thought of a thing yesterday; I ceased to

[*See George Berkeley. *A Treatise Concerning the Principles of Human Knowledge*. In *Works*. London: Priestley, 1820, Vol. I, pp. 1–106.]

[g-g]+Source [9th ed.], 51, 56, 62, 65, 68, 72
[h-h]MS, 43, 46, 51, 56, 62, 65 essentially the same as
[i-i]MS, 43, 46 philosophy, sprung
[j-j]MS, 43, 46, 51, 56 had, however, seen
[k-k]MS, 43, 46 the higher
[l-l]MS, 43, 46 philosopher

think of it; I think of it again to-day. I had, therefore, in my mind yesterday an *idea* of the object; I have also an idea of it to-day; this idea is evidently not another, but the very same idea. Yet an intervening time elapsed in which I had it not. Where was the idea during this interval? It must have been somewhere; it did not cease to exist; otherwise the idea I [m]had yesterday[m] could not be the *same* idea; no more than the man I see alive to-day can be the same whom I saw yesterday if the man has died in the meanwhile. Now an idea cannot be conceived to exist anywhere except in a mind; and hence there must exist an Universal Mind, in which all ideas have their permanent residence, during the intervals of their conscious presence in our own minds.

[n]It is evident that[n] Berkeley here confounded sameness *numero* with sameness *specie*, that is, with exact resemblance, and assumed the former [o]where[o] there was only the latter [p]; not perceiving[p] that when we say we have the same thought to-day which we had yesterday, we do not mean the same individual thought, but a thought exactly similar: as we say that we have the same illness which we had last year, [q]meaning only the same sort[q] of illness.

In one remarkable instance the scientific world was divided into two furiously hostile parties by an ambiguity of language affecting a branch of science which, more completely than most others, enjoys the advantage of a precise and well-defined terminology. I refer to the famous dispute respecting the *vis viva*, the history of which is given at large in Professor Playfair's *Dissertation*. The question was, whether the *force* of a moving body was proportional (its mass being given) to its velocity simply, or to the square of its velocity: and the ambiguity was in the word Force. "One of the effects," says Playfair, "produced by a moving body is proportional to the square of the velocity, while another is proportional to the velocity simply:"[*] from whence clearer thinkers were subsequently led to establish a double measure of the efficiency of a moving power, one being called *vis viva*, and the other *momentum*. About the facts, both parties were from the first agreed: the only question was, with which of the two effects the term *force* should be, or could most conveniently be, associated. But the disputants were by no means aware that this was all; they thought that force was one thing, the production of effects another; and the question, by which set of effects the force which produced both the one and the other should be measured, was supposed to be a question not of terminology, but of fact.

The ambiguity of the word Infinite is the real fallacy in the amusing logical

[**Dissertation*, Vol. IV, p. 36.]

[m-m]MS have today
[n-n]MS, 43, 46 That
[o-o]43, 46, 51 when [*printer's error?*]
[p-p]MS , hardly needs be more particularly pointed out. He could never have broached this strange theory if he had reflected,] 43, 46 *as* MS . . . he had understood,
[q-q]MS though it is not the same *fit*

puzzle of Achilles and the Tortoise, a puzzle which has been too hard for the ingenuity or patience of many philosophers, and [r]which no less a thinker than Sir William Hamilton considered[r] as insoluble; as a sound argument though leading to a palpable falsehood [s] .[*] The fallacy, as Hobbes hinted,[†] lies in the tacit assumption that whatever is infinitely divisible is infinite; but [t]the following solution (to the invention of which I have no claim) is more precise and satisfactory.[t]

The argument is, let Achilles run ten times as fast as the tortoise, yet if the tortoise has the start, Achilles will never overtake him. For suppose them to be at first separated by an interval of a thousand feet: when Achilles has run these thousand feet, the tortoise will have got on a hundred; when Achilles has run those hundred, the tortoise will have run ten, and so on for ever: therefore Achilles may run for ever without overtaking the tortoise.

Now the "for ever," in the conclusion, means, for any length of time that can be supposed; but in the premises, "ever" does not mean any *length* of time; it means any *number of subdivisions* of time. It means that we may divide a thousand feet by ten, [u] and that quotient again by ten, and so on as often as we please; that there never needs be an end to the subdivisions of the distance, nor consequently to those of the time in which it is performed. But an unlimited number of subdivisions may be made of that which is itself limited. The argument proves no other infinity of duration than may be embraced within five minutes. As long as the five minutes are not expired, what remains of them may be divided by ten, and again by ten, as often as we like, which is perfectly compatible with their being only five minutes altogether. It proves, in short, that to pass through this finite space requires a time which is infinitely divisible, but not an infinite time; the confounding of which distinction Hobbes had already seen to be the gist of the fallacy.

The following ambiguities of the word *right* (in addition to the obvious and familiar one of *a* right and the *adjective* right) are [v]extracted[v] from a forgotten paper of my own, in a periodical [w] :[‡]

[*See *Lectures on Metaphysics and Logic*, Vol. II, p. 373.]
[†"Computation or Logic," pp. 63–4.]
[‡"Use and Abuse of Political Terms," *Tait's Edinburgh Magazine*, I (May, 1832), p. 169.]

[r–r]MS, 43, 46, 51, 56, 62, 65 among others of Dr. Thomas Brown [see *Inquiry into the Relation of Cause and Effect*, pp. 481–2], who considered the sophism
[s]MS, 43, 46, 51, 56, 62, 65 ; not seeing that such an admission would be a *reductio ad absurdum* of the reasoning faculty itself
[t–t]MS I am indebted for a more precise solution of it to a friend, of whom it is to be regretted, that his great capacity for abstract metaphysics has never exercised itself in the composition of any work on the subject.* [*footnote:*] *Mr. Graham, one of the official assignees in Bankruptcy.
[u]MS & the quotient by ten,
[v–v]43 abstracted
[w]MS, 43, 46 work

Speaking morally, you are said to have a right to do a thing, if all persons are morally bound not to hinder you from doing it. But, in another sense, to have a right to do a thing is the opposite of having *no* right to do it, [x]*i.e.*[x] of being under a moral obligation to forbear [y] doing it. In this sense, to say that you have a right to do a thing, means that you may do it without any breach of duty on your part; that other persons not only ought not to hinder you, but have no cause to think [z] worse of you for doing it. This is a perfectly distinct proposition from the preceding. The right which you have by virtue of a duty incumbent upon other persons, is obviously quite a different thing from a right consisting in the absence of any duty incumbent upon yourself. Yet the two things are perpetually confounded. Thus a man will say he has a right to publish his opinions; which may be true in this sense, that it would be a breach of duty in any other person to interfere and prevent the publication: but he assumes thereupon, that in publishing his opinions, he himself violates no duty; which may either be true or false, depending, as it does, on his having taken due pains to satisfy himself, first, that the opinions are true, and next, that their publication in this manner, and at this particular juncture, will probably be beneficial to the interests of truth on the whole.

The second ambiguity is that of confounding a right of any kind, with a right to enforce that right by resisting or punishing a violation of it. [a]People[a] will say, for example, that they have a right to [b] good government, which is undeniably true, it being the moral duty of their governors to govern them well. But in granting this, you are supposed to have admitted their right or liberty to turn out their governors, and perhaps to punish them, for having failed in the performance of this duty; which, far from being the same thing, is by no means universally true, but depends on an immense number of varying circumstances, [c]

requiring to be conscientiously weighed before adopting or acting on such a resolution.[c] [d]This last[d] example is (like [e]others which have been[e] cited) a case of fallacy within fallacy; it involves not only the second of the two ambiguities pointed out, but the first likewise.

One not unusual form of the Fallacy of Ambiguous Terms, is known technically as the Fallacy of Composition and Division: when the same term is collective in the premises, distributive in the conclusion, or *vice versâ*: or when the middle term is collective in one premise, distributive in the other. As if one were to say (I quote from Archbishop Whately) "All the angles of a triangle are equal to two right angles: ABC is an angle of a triangle; therefore ABC is equal to two right angles. . . . There is no fallacy [f] more common, or more likely to deceive, than the one now before us. The form in which it is most usually employed is to establish some truth, separately, concerning

[x-x]Source, MS, 43, 46 viz.,
[y]Source, MS, 43, 46 from
[z]Source, MS, 43, 46 the
[a-a]Source, MS, 43, 46 Men
[b]Source, MS, 43, 46, 51, 56 a
[c-c]Source and is, perhaps, altogether the knottiest question in practical ethics.] MS, 43, 46 and is altogether one of the knottiest questions in practical ethics.
[d-d]MS The] 43 This
[e-e]MS some others which we have
[f]MS, 43 ," continues the archibishop, "

each single member of a certain class, and thence to infer the same of the *whole collectively*."[*] As in the argument one [g]sometimes hears[g], to prove that the world could do without great men. If Columbus (it is said) had never lived, America would still have been discovered, at most only a few years later; if Newton had never lived, some other person would have discovered the law of gravitation; and so forth. Most true: these things would have been done, but in all probability not [h]till[h] some one had again been found with the qualities of [i]Columbus or[i] Newton. Because any one great man might have had his place supplied by [j]other great men[j], the argument concludes that all great men could have been dispensed with. The term "great men" is distributive in the premises and collective in the conclusion.

Such also [k] is the fallacy which probably operates on most adventurers in lotteries; *e.g.* 'the gaining of a high prize is no uncommon occurrence; and what is no uncommon occurrence may reasonably be expected; therefore the gaining of a high prize may reasonably be expected:' the conclusion when applied to the individual (as in practice it is) must be understood in the sense of 'reasonably expected *by a certain individual*;' therefore for the major premise to be true, the middle term must be understood to mean, 'no uncommon occurrence to some one *particular* person;' whereas for the minor (which has been placed first) to be true, you must understand it of 'no uncommon occurrence to *some one or other*;' [l]and[l] thus you will have the Fallacy of Composition.[†]

This is a Fallacy with which men are extremely apt to deceive *themselves*; for when a multitude of particulars are presented to the mind, many are too weak or too indolent to take a comprehensive view of them, but confine their attention to each single point, by turns; and then decide, infer, and act, accordingly: *e.g.* the imprudent spendthrift, finding that he is able to afford this, *or* that, *or* the other expense, forgets that *all of them together* will ruin him.[‡]

The debauchee destroys his health by successive acts of intemperance, because no *one* of those acts would be of itself sufficient to do him any serious harm. A sick person reasons with himself, "one, and another, and another, of my symptoms, do not prove that I have a fatal disease;" and practically concludes that all taken together do not prove it.

§ 2. [*Fallacy of* Petitio Principii] We have now sufficiently exemplified one of the principal Genera in this Order of Fallacies; where, the source of

[**Elements of Logic*, pp. 194, 196.]
[†*Ibid.*, p. 196.]
[‡*Ibid.*, p. 198; the following examples are not Whately's.]

[g-g]MS, 43, 46 often hears, sometimes from persons worthy of better things
[h-h]MS, 43, 46, 51, 56, 62, 65, 68 until
[i-i]MS, 43, 46 a Columbus or a
[j-j]MS, 43, 46 the help of others
[k]MS, 43 ," says Archbishop Whately, "
[l-l]+Source, 51, 56, 62, 65, 68, 72 [*probably in* MS *which is here torn at the edge*]

error being the ambiguity of terms, the premises are verbally what is required to support the conclusion, but not really so. In the second great Fallacy of Confusion they are neither verbally nor really sufficient, though, from their multiplicity and confused arrangement, and still oftener from defect of memory, they are not seen to be what they are. The fallacy I mean is that of Petitio Principii, or begging the question; including [a]the[a] more complex and not uncommon variety of it, which is termed Reasoning in a Circle.

Petitio Principii, as defined by Archbishop Whately, is the fallacy "in which the premise either appears manifestly to be the same as the conclusion, or is actually proved from the conclusion, or is such as would naturally and properly so be proved."[*] By the last clause I presume is meant, that it is not susceptible of any other proof; for otherwise, there would be no fallacy. To deduce from a proposition, propositions from which it would itself more naturally be deduced, is often an allowable deviation from the usual didactic order; or at most, what, by an adaptation of a phrase familiar to mathematicians, may be called a logical *inelegance*.*

The employment of a proposition to prove that on which it is itself dependent for proof, by no means implies the degree of mental imbecility which might at first be supposed. The difficulty of comprehending how this fallacy could possibly be committed, disappears when we reflect that all persons, even [b]the instructed[b], hold a great number of opinions without exactly recollecting how they came by them. Believing that they have at some former time verified them by sufficient evidence, but having forgotten what the evidence was, they may easily be betrayed into deducing from them the very propositions which are alone capable of serving as premises for their establishment. [c]"As if," says Archbishop Whately, "one[c] should attempt to prove the being of a God from the authority of Holy Writ;"[†] which might easily happen to one with whom both [d]doctrines, as fundamental tenets of his religious creed[d], stand on the same ground of familiar and traditional belief.

Arguing in a circle, however, is a stronger case of the fallacy, and implies

[**Elements of Logic*, 1st ed., p. 179.]

*[51] In his later editions, Archbishop Whately confines the name of Petitio Principii "to those cases in which one of the premises either is manifestly the same in sense with the conclusion, or is actually proved from it, or is such as the persons you are addressing are not likely to know, or to admit, except as an inference from the conclusion: as, *e.g.* if any one should infer the authenticity of a certain history, from its recording such and such facts, the reality of which rests on the evidence of that history." [*Ibid.*, 9th ed., p. 200.]

[†*Ibid.*, 1st ed., p. 179.]

[a-a]MS, 43, 46, 51, 56, 62 that
[b-b]MS, 43, 46 philosophers
[c-c]MS, 43 An example is given by Archbishop Whately: "As if one
[d-d]MS, 43, 46 propositions, as fundamental tenets of his religion

more than the mere passive reception of a premise by one who does not remember how it is to be proved. It implies an actual attempt to prove two propositions reciprocally from one another; and is seldom resorted to, at least in express terms, by any person in his own speculations, but is committed by those who, being hard pressed by an adversary, are forced into giving reasons for an opinion of which, when they began to argue, they had not sufficiently considered the grounds. As in the following example from Archbishop Whately: "Some mechanicians attempt to prove (what they ought to lay down as a probable but doubtful hypothesis*) that every particle of matter gravitates equally: 'why?' 'because those bodies which contain more particles ever gravitate more strongly, *i.e.* are heavier:' 'but, (it may be urged,) those which are heaviest are not always more bulky;' 'no, but they contain more particles, though more closely condensed:' 'how do you know that?' 'because they are heavier:' 'how does that prove it?' 'because all particles of matter gravitating equally, that mass which is specifically the heavier must needs have the more of them in the same space.' "[*] It appears to me that the fallacious reasoner, in his private thoughts, would not be likely to proceed beyond the first step. [g] He would acquiesce in the sufficiency of the reason first given, "bodies which contain more particles are heavier." It is when he finds this questioned, and is called upon to prove it, without knowing how, that he tries to establish his premise by supposing proved what he is attempting to prove by it. The most effectual way, in fact, of exposing a Petitio Principii, when circumstances allow of it, is by challenging the reasoner to prove his premises; which if he attempts to do, he is necessarily driven into arguing in a circle.

It is not uncommon, however, for thinkers, and those not of the lowest description, to be led even in their own thoughts, not indeed into formally proving each of two propositions from the other, but into admitting propositions which can only be so proved. In the preceding example the two

*No longer even a probable hypothesis, [e]since the establishment of the atomic theory[e]; it being now certain that the [f]integral[f] particles of different substances gravitate unequally. It is true that these particles, though real *minima* for the purposes of chemical combination, may not be the ultimate particles of the substance; and this doubt alone renders the hypothesis admissible, even as an hypothesis. [*JSM's note.*]

[**Elements of Logic*, p. 201.]

[e-e]MS, 43, 46 but (since the establishment of the atomic theory) opposed to all probability

[f-f]MS, 43 integrant

[g]MS, 43 [*footnote:*] *I have found, however, an argument of this exact type in a *Bridgewater Treatise* [Prout, *Chemistry, Meteorology, and the Function of Digestion*, p. 52]: "Ice and silver, under the same volume, contain very unequal portions of matter, the silver being ten times as heavy as the ice. The vacuities in the ice, therefore, must be very much greater than those in the silver."

together form a complete and consistent, though hypothetical, explanation of the facts concerned. And the tendency to mistake mutual coherency for truth; to trust one's safety to a strong chain though it has no point of support; is at the bottom of much which, when reduced to the strict forms of argumentation, can exhibit itself no otherwise than as reasoning in a circle. All experience bears testimony to the enthralling effect of neat concatenation in a system of doctrines, and the difficulty with which [h]people[h] admit the persuasion that anything which holds so well together can possibly fall.

Since every case where a conclusion which can only be proved from certain premises is used for the proof of those premises, is a case of *petitio principii*, that fallacy includes a very great proportion of all incorrect reasoning. It is necessary, for completing our view of the fallacy, to exemplify some of the disguises under which it is accustomed to mask itself, and to escape exposure.

A proposition would not be admitted by any person in his senses as a corollary from itself, unless it were expressed in language which made it seem different. One of the commonest modes of so expressing it, is to present the proposition itself in abstract terms, as a proof of the same proposition expressed in concrete language. This is a very frequent mode, not only of pretended proof, but of pretended explanation; and is parodied [i]when Molière makes one of his absurd physicians say,[i]

[j]Mihi à docto doctore,
Domandatur causam et rationem quare
Opium facit dormire.
A quoi respondeo,
Quia est in eo
Virtus dormitiva,
Cujus est natura
Sensus assoupire.[j][*]

The words Nature and Essence are grand instruments of this mode of begging the question. As in the well-known argument of the scholastic theologians, that the mind thinks always, because the *essence* of the mind is to think. Locke had to point out, that if by essence is here meant some property which must manifest itself by actual exercise at all times, the

[*"Troisième Intermède," *Le Malade Imaginaire*.]

[h-h]MS, 43, 46 men

[i-i]MS, 43 by Molière when he makes one of his absurd physicians say, "l'opium endormit parcequ'il a une vertu soporifique," or, in the amusing doggrel quoted by Mr. Whewell,] 46, 51, 56, 62, 65, 68 *as* 72 . . . say, "l'opium . . . *as* MS . . . in the equivalent doggrel,

[j-j]MS, 43, 46, 51, 56, 62, 65 Mihi demandatur / A doctissimo doctore, / Quare opium facit dormire; / Et ego respondeo, / Quia est in eo / Virtus dormitiva, / Cujus natura est sensus assourpire. [Whewell, *Philosophy of the Inductive Sciences*, Vol. II, pp. 455–6.]

premise is a direct assumption of the conclusion; while if it only means that to think is the distinctive property of a mind, there is no connexion between the premise and the conclusion, since it is not necessary that a distinctive property should be perpetually in action.

The following is one of the modes in which these abstract terms, Nature and Essence, are used as instruments of this fallacy. Some particular properties of a thing are selected, more or less arbitrarily, to be termed its nature or essence; and when this has been done, [k]these[k] properties are supposed to be invested with a kind of indefeasibleness; to have become paramount to all the other properties of the thing, and incapable of being prevailed over or counteracted by them. As when Aristotle, in a passage [l]already cited[l], "decides that there is no void on such arguments as this: in a void there could be no difference of up and down; for as in nothing there are no differences, so there are none in a privation or negation; but a void is merely a privation or negation of matter; therefore, in a void, bodies could not move up and down, which it is in their *nature* to do."* In other words; it is [m]in[m] the *nature* of bodies to move up and down, *ergo* any physical fact which supposes them not so to move, cannot be authentic. This mode of reasoning, by which a bad generalization is made to overrule all facts which contradict it, is *petitio principii* in one of its most palpable forms.

None of the modes of assuming what should be proved are in more frequent use than what are termed by [n] Bentham "question-begging appellatives;"[*] names which beg the question under the [o]disguise[o] of stating it. The most potent of these are such as have a laudatory or vituperative character. For instance, in politics, the word Innovation. The dictionary meaning of this term being merely "a change to something new," it is difficult for the defenders even of the most salutary improvement to deny that it is an innovation; yet the word having acquired in common usage a vituperative connotation in addition to its dictionary meaning, the admission is always construed as a large concession to the disadvantage of the thing proposed.

The following passage from the argument in refutation of the Epicureans, in the second book of Cicero *De Finibus*, affords a fine example of this sort of fallacy. "Et quidem illud ipsum non nimium probo (et tantum patior) philosophum loqui de cupiditatibus finiendis. An potest cupiditas finiri? tollenda

*[Whewell,] *History of the Inductive Sciences*, [3rd ed.,] Vol. I, p. 34 [Quoted also at p. 762 above; the reference to Aristotle is to *Physics*, Vol. I, pp. 336ff.]

[*Book of Fallacies*, p. 213.]

[k-k]MS those
[l-l]MS, 43 which we have already cited from Mr. Whewell
[m-m]+51, 56, 62, 65, 68, 72
[n]MS Mr.
[o-o]MS, 43, 46, 51 guise

est, atque extrahenda radicitus. Quis est enim, in quo sit cupiditas, quin recte cupidus dici possit? Ergo et avarus erit, sed finite: adulter, verum habebit modum: et luxuriosus eodem modo. Qualis ista philosophia est, quæ non interitum afferat pravitatis, sed sit contenta mediocritate vitiorum?" The question was, whether certain desires, when kept within [p] bounds, are vices or not; and the argument decides the point by applying to them a word (*cupiditas*) which *implies* vice. It is shown, however, in the remarks which follow, that Cicero did not intend this as a serious argument, but as a criticism on what he deemed an inappropriate expression. "Rem ipsam prorsus probo: elegantiam desidero. Appellet hæc *desideria naturæ*; cupiditatis nomen servet alio," &c.[*] But many persons, both ancient and modern, have employed this, or something equivalent to it, as a real and conclusive argument. We may remark that the passage respecting *cupiditas* and *cupidus* is also an example of another fallacy already noticed, that of Paronymous Terms.

Many more of the arguments of the ancient moralists, and especially of the Stoics, fall within the definition of Petitio Principii. In the *De Finibus*, for example, which I continue to quote as being probably the best extant exemplification at once of the doctrines and the methods of the schools of [q] philosophy existing at that time; [r]of what value as arguments are such pleas as those of Cato in the third book[r]: That if virtue were not happiness, it could not be a thing to *boast* of: That if death or pain were evils, it would be impossible not to fear them, and it could not, therefore, be laudable to despise them, &c.[†] In one way of viewing these arguments, they may be regarded as appeals to the authority of the general sentiment of mankind which had stamped its approval upon certain actions and characters by the phrases referred to; but that such could have been the meaning intended is very unlikely, considering the contempt of the ancient philosophers for vulgar opinion. In any other sense they are clear cases of Petitio Principii, since the word laudable, and the idea of boasting, imply principles of conduct; and practical maxims can only be proved from speculative truths, namely from the properties of the subject matter, and cannot, therefore, be employed to prove those properties. As well might it be argued that a government is good because we ought to support it, or that there is a God because it is our duty to pray to him.

It is assumed by all the disputants in the *De Finibus* as the foundation of

[*Ed. Rackham, p. 112 (Bk. II, Chap. ix).]
[†See *ibid.*, pp. 246–8 (Bk. III, Chap. viii).]

[p]MS, 43, 46 definite
[q]MS, 43, 46 Greek
[r-r]MS, 43, 46 what are we to think of the arguments of Cato in the third book, derived from common notions

the inquiry into the *summum bonum*, that "sapiens semper beatus est."[*] ˢNot simply that wisdom gives the best chance of happiness, or that wisdom consists in knowing what happiness is, and by what things it is promoted; these propositions would not have been enough for them:—but that the sage always is, and must of necessity be, happy.ˢ The idea that wisdom could be consistent with unhappiness, was always rejected as inadmissible: the reason assigned by one of the interlocutors, near the beginning of the third book, being, that if the wise could be unhappy, there was ᵗlittleᵗ use in pursuing wisdom.[†] But by unhappiness they did not mean pain or suffering; to that it was granted that the wisest person was liable in common with others: he was happy, because in possessing wisdom he had the most valuable of ᵘallᵘ possessions, the most to be sought and prized of all things, and to possess the most valuable thing was to be the most happy. By laying it down, therefore, at the commencement of the inquiry, that the sage must be happy, the disputed question respecting the *summum bonum* was in fact begged; with the further assumption, that pain and suffering, so far as they can coexist with wisdom, are not unhappiness, and are no evil.

The following are additional instances of Petitio Principii, under more or less of disguise.

Plato, in the *Sophistes*, attempts to prove that things may exist which are incorporeal, by the argument that justice and wisdom are incorporeal, and justice and wisdom must be something.[‡] Here, if by *something* be meant, as Plato did in fact mean, a thing capable of existing in and by itself, and not as a quality of some other thing, he begs the question in asserting that justice and wisdom must be something: if he means anything else, his conclusion is not proved. This fallacy might also be classed under ambiguous middleterm: *something*, in the one premise, meaning some substance, in the other merely some object of thought, whether substance or attribute.

It was formerly an argument ᵛemployedᵛ in proof of what is now no longer a popular doctrine, the infinite divisibility of matter, that every portion of matter, however small, must at least have an upper and an under surface. Those who used this argument did not see that it assumed the very point in dispute, the impossibility of arriving at a minimum of thickness; for if there be a minimum, its upper and under surface will of course be one: it will be itself a surface, and no more. The argument owes its very considerable plausibility to this, that the premise does actually seem more obvious than

[*See, e.g., *ibid.*, p. 64 (Bk. I, Chap. xix).]
[†See *ibid.*, p. 228 (Bk. III, Chap. iii).]
[‡See *Sophist*, 246ᵉ ff.; in *The Dialogues of Plato*, tr. Jowett, Vol. III, p. 399.]

ˢ⁻ˢ+51, 56, 62, 65, 68, 72
ᵘ⁻ᵘ+51, 56, 62, 65, 68, 72
ᵗ⁻ᵗMS, 43, 46 not much
ᵛ⁻ᵛ+43, 46, 51, 56, 62, 65, 68, 72

the conclusion, though really identical with it. As expressed in the premise, the proposition appeals directly and in concrete language to the incapacity of the human imagination for conceiving a minimum. Viewed in this light, it becomes a case of the *à priori* fallacy or natural prejudice, that whatever cannot be conceived cannot exist. Every fallacy of Confusion (it is almost unnecessary to repeat) will, if cleared up, become a fallacy of some other sort; and it will be found of deductive or ratiocinative fallacies generally, that when they mislead, there is mostly, as in this case, a [w] fallacy of some other description lurking under them, by virtue of which chiefly it is that the verbal juggle, which is the outside or body of this kind of fallacy, passes undetected.

Euler's *Algebra*, a book otherwise of great merit, but full, to overflowing, of logical errors in respect to the foundation of the science, [x]contains[x] the following argument to prove that *minus* multiplied by *minus* gives *plus*, a doctrine the opprobrium of all [y]mere mathematicians[y], and which Euler had not a glimpse of the true method of proving. He says *minus* multiplied by *minus* cannot give *minus*; for *minus* multiplied by *plus* gives *minus*, and *minus* multiplied by *minus* cannot give the same product as *minus* multiplied by *plus*.[*] Now one is obliged to ask, why minus multiplied by minus must give any product at all? and if it does, why its product cannot be the same as that of minus multiplied by plus? for this would seem, at the first glance, not more absurd than that minus by minus should give the same as plus by plus, the proposition which Euler prefers to it. The premise requires proof, as much as the conclusion: nor can it be proved, except by that more comprehensive view of the nature of multiplication, and of algebraic processes in general, which would also supply a far better proof of the mysterious doctrine which Euler is here endeavouring to demonstrate.

A [z] striking instance of reasoning in a circle is that of some ethical [a]writers[a], who first take for their standard of moral truth what, being the general, they deem to be the natural or instinctive sentiments and perceptions of mankind, and then explain away the numerous instances of divergence from their assumed standard, by representing them as cases in which the perceptions are unhealthy. Some particular mode of conduct or feeling is affirmed to be *unnatural*; why? because it is abhorrent to the universal and natural sentiments of mankind. Finding no such sentiment in yourself, you question the fact; and the answer is (if your antagonist is polite), that you

[*Leonhard Euler. *Elements of Algebra*. Tr. M. Bernoulli. 2 vols. London: Johnson, 1797, Vol. I, p. 13 (Pt. I, Sec. I, Chap. i, Art. 33).]

[w]MS, 43, 46 latent
[x–x]MS makes use of
[y–y]MS, 43, 46 mathematicians who are not philosophers
[z]MS, 43, 46 very
[a–a]MS, 43, 46 philosophers

are an exception, a peculiar case. But neither (say you) do I find in the people of some other country, or of some former age, any such feeling of abhorrence; "ay, but their feelings were sophisticated and unhealthy."

One of the most notable specimens of reasoning in a circle is the doctrine of Hobbes, Rousseau, and others, which rests the obligations by which human beings are bound as members of society, on a supposed social compact. I wave the consideration of the fictitious nature of the compact itself; but when [b]Hobbes, through the whole *Leviathan*,[b] elaborately deduces the obligation of obeying the sovereign, not from the necessity or utility of doing so, but from a promise supposed to have been made by our ancestors, on renouncing savage life and agreeing to establish political society, it is impossible not to retort by the question, why are we bound to keep a promise made for us by others? or why bound to keep a promise at all? No satisfactory ground can be assigned for the obligation, except the mischievous consequences of the absence of faith and mutual confidence among mankind. We are, therefore, brought round to the interests of society, as the ultimate ground of the obligation of a promise; and yet those interests are not admitted to be a sufficient justification for the existence of government and law. Without a promise it is thought that we should not be bound to that [c]which is implied in all modes of living in society[c], namely, to yield a general obedience to the laws therein established; and so necessary is the promise deemed, that if none has actually been made, some additional safety is supposed to be given to the foundations of society by feigning one.

§ 3. [*Fallacy of* Ignoratio Elenchi] Two principal subdivisions of the class of Fallacies of Confusion having been disposed of; there remains a third, in which the confusion is not, as in the Fallacy of Ambiguity, in misconceiving the import of the premises, nor, as in *Petitio Principii*, in forgetting what the premises are, but in mistaking the conclusion which is to be proved. This is the fallacy of *Ignoratio Elenchi*, in the widest sense of the phrase; also called by Archbishop Whately the Fallacy of Irrelevant Conclusion. His [a]examples[a] and remarks are highly worthy of citation.

Various kinds of propositions are, according to the occasion, substituted for the one of which proof is required: sometimes the particular for the universal; sometimes a proposition with different terms; and various are the contrivances employed to effect and to conceal this substitution, and to make the conclusion which the sophist has drawn, answer practically the same purpose as the one he ought to have established. We say, 'practically the same purpose,' because it will very often happen that some *emotion* will be excited, some sentiment impressed on the mind, (by a dexterous employment of this fallacy), such as shall bring men into the

[b-b]MS, 43 a philosopher (as Hobbes does through the whole *Leviathan*)
[c-c]MS, 43, 46 without which the existence of society would be impossible
[a-a]MS example

disposition requisite for your purpose; though they may not have assented to, or even stated distinctly in their own minds, the *proposition* which it was your business to establish. Thus if a sophist has to defend one who has been guilty of some *serious* offence, which he wishes to extenuate, though he is unable distinctly to prove that it is not such, yet if he can succeed in *making the audience laugh* at some casual matter, he has gained practically the same point. So also if any one has pointed out the extenuating circumstances in some particular case of offence, so as to show that it differs widely from the generality of the same class, the sophist if he find himself unable to disprove these circumstances, may do away the force of them, by simply *referring the action to that very class*, which no one can deny that it belongs to, and the very name of which will excite a feeling of disgust sufficient to counteract the extenuation; *e.g.* let it be a case of peculation, and that many *mitigating* circumstances have been brought forward which cannot be denied; the sophistical opponent will reply, 'Well, but after all, the man is a *rogue*, and there is an end of it;' now in reality this was (by hypothesis) never the question; and the mere assertion of what was never denied, *ought* not, in fairness, to be regarded as decisive: but, practically, the odiousness of the word, arising in great measure from the association of those very circumstances which belong to most of the class, but which we have supposed to be *absent* in *this particular* instance, excites precisely that feeling of disgust, which in effect destroys the force of the defence. In like manner we may refer to this head all cases of improper appeal to the passions, and everything else which is mentioned by Aristotle as extraneous to the matter in hand (ἔξω τοῦ πράγματος).[*]

[b]Again,

instead of proving that 'this prisoner has committed an atrocious fraud,' you prove that the fraud he is accused of is atrocious: instead of proving (as in the well-known tale of Cyrus and the two coats) that the taller boy had a right to force the other boy to exchange coats with him, you prove that the exchange would have been advantageous to both: instead of proving that the poor ought to be relieved in this way rather than in that, you prove that the poor ought to be relieved: instead of proving that [c]the[c] irrational agent—whether a brute or a madman—can never be deterred from any act by apprehension of punishment (as for instance a dog from sheep-biting, by fear of being beaten), you prove that the beating of one dog does not operate as an *example* to *other* dogs, &c.[b]

It is evident that *ignoratio elenchi* may be employed as well for the apparent refutation of your opponent's proposition, as for the apparent establishment of your own; for it is substantially the same thing, to prove what was not denied or to disprove what was not asserted. The latter practice is not less common, and it

[**Elements of Logic*, pp. 212–13. Whately is quoting from Aristotle's *Rhetoric*; see, e.g., 1354[a] 15 (Bk. I, Chap. i).]

[b-b]MS, 43, 46 "A good instance of the employment and exposure of this fallacy occurs in Thucydides, in the speeches of Cleon and Diodotus concerning the Mitylenæans: the former (over and above his appeal to the angry passions of his audience) urges the *justice* of putting the revolters to death; which, as the latter remarked, was nothing to the purpose, since the Athenians were not sitting in *judgment*, but in *deliberation*, of which the proper end is *expediency*." [*Ibid.*, 9th ed., p. 214; *in 1st ed., p. 189, this leads directly into the passage next quoted. The reference is to* Thucydides, *History of the Peloponnesian War*, Vol. II, pp. 68, 76 (Bk. III, Chaps. xl, xliv).]

[c-c]Source, 51, 56 an

is more offensive, because it frequently amounts to a personal affront, in attributing to a person, opinions, &c., which he perhaps holds in abhorrence. Thus, when in a discussion one party vindicates, on the ground of general expediency, a particular instance of resistance to government in a case of intolerable oppression, the opponent may gravely maintain, that 'we ought not to do evil that good may come;' a proposition which of course had never been denied, the point in dispute being, 'whether resistance in this particular case *were* doing evil or not.' [d]Or again, by way of disproving the assertion of the right of private judgment in religion, one may hear a grave argument to prove that 'it is impossible every one can be *right in his judgment*.'[d][*]

The works of controversial writers are seldom free from this fallacy. [e] The attempts, for instance, to disprove the population doctrines of Malthus, have been mostly cases of *ignoratio elenchi.* Malthus has been supposed to be refuted if it could be shown that in some countries or ages population has been nearly stationary; as if he had asserted that population always increases in a given ratio, or had not expressly declared that it increases only in so far as it is not restrained by prudence, or kept down by poverty and disease. Or, perhaps, a [f] collection of facts is produced to prove that in some one country the people are better off with a dense population than they are in another country with a thin one; or that the people have become more numerous and better off at the same time. As if the assertion were that a dense population could not possibly be well off: as if it were not part of the very doctrine, and essential to it, that where there is a more abundant [g]production[g] there may be a greater population without any increase of poverty, or even with a diminution of it.

The favourite argument against Berkeley's theory of the non-existence of matter, and the most popularly effective, next to a "grin"*—an argument, moreover, which is not confined to "coxcombs," nor to men like Samuel Johnson,[†] [i]whose greatly overrated ability certainly did not lie in the direction of[i] metaphysical speculation, but is the stock argument of the Scotch school of metaphysicians—is a palpable *ignoratio elenchi.* The argument is perhaps as frequently expressed by gesture as by words, and one of its com-

[**Ibid.*, pp. 213–15.]

*"And coxcombs vanquish Berkeley with a grin." [h] [John Brown. "An Essay on Satire: Occasioned by the Death of Mr. Pope," in *A Collection of Poems. By Several Hands.* 3 vols. London: Dodsley, 1748, Vol. III, p. 124 (Pt. 2, l. 54).]

[†See James Boswell. *Life of Johnson.* Ed. George Birkbeck Hill and L. F. Powell. 6 vols. Oxford: Clarendon Press, 1934, Vol. I, p. 471 (6 Aug., 1763).]

[d-d]+Source [9th ed.], 51, 56, 62, 65, 68, 72
[e]MS, 43, 46 They join issue on the wrong point, or do not join issue at all.
[f]MS, 43 great
[g-g]MS, 43, 46, 51, 56, 62, 65, 68 capital
[h]MS, 43, 46 (Pope.) [*a mistaken attribution; see footnote above*]
[i-i]MS, 43, 46 of practical understanding, without any particular turn for

monest forms consists in knocking a stick against the ground. This short and easy confutation overlooks the fact, that in denying matter, Berkeley did not deny anything to which our senses bear witness, and therefore cannot be answered by any appeal to them. His scepticism related to the supposed substratum, or hidden cause of the appearances perceived by our senses: the evidence of which, whatever may be [j]thought of[j] its conclusiveness, is certainly not the evidence of sense. And it will always remain a signal proof of the want of metaphysical profundity of Reid, Stewart, and, I am sorry to add, of Brown, that they should have persisted in asserting that Berkeley, if he believed his own doctrine, was bound to walk into the kennel, or run his head against a post. As if [k]persons[k] who do not recognise an occult cause of their sensations, could not possibly believe that a fixed order subsists among the sensations themselves. Such a want of comprehension of the distinction between a thing and its sensible manifestation, or, in [l]metaphysical[l] language, between the noumenon and the phenomenon, would be impossible to even the dullest disciple of Kant or Coleridge.

It would be easy to add a greater number of examples of this fallacy, as well as of the others which I have attempted to characterize. But a more copious exemplification does not seem to be necessary; and the intelligent reader will have little difficulty in adding to the catalogue from his own reading and experience. We shall therefore here close our exposition of the general principles of logic, and proceed [m] to the [n]supplementary[n] inquiry which is necessary to complete our design.

[j-j]+51, 56, 62, 65, 68, 72
[k-k]MS, 43, 46 men
[l-l]MS, 43, 46 transcendental
[m]MS, 43, 46 at once
[n-n]MS, 43, 46, 51, 56 supplemental

BOOK VI

ON THE LOGIC OF THE MORAL SCIENCES

[a]"Si l'homme peut prédire, avec une assurance presque entière, les phénomènes dont il connaît les lois; si lors même qu'elles lui sont inconnues, il peut, d'après l'expérience, prévoir avec une grande probabilité les événemens de l'avenir; pourquoi regarderait-on comme une entreprise chimérique, celle de tracer avec quelque vraisemblance le tableau des destinées futures de l'espèce humaine, d'après les résultats de son histoire? Le seul fondement de croyance dans les sciences naturelles, est cette idée, que les lois générales, connues ou ignorées, qui règlent les phénomènes de l'univers, sont nécessaires et constantes; et par quelle raison ce principe serait-il moins vrai pour le développement des facultés intellectuelles et morales de l'homme, que pour les autres opérations de la nature? Enfin, puisque des opinions formées d'après l'expérience . . . sont la seule règle de la conduite des hommes les plus sages, pourquoi interdirait-on au philosophe d'appuyer ses conjectures sur cette même base, pourvu qu'il ne leur attribue pas une certitude supérieure à celle qui peut naître du nombre, de la constance, de l'exactitude des observations?" [Marie Jean Caritat, marquis de] Condorcet, *Esquisse d'un Tableau Historique des Progrès de l'Esprit Humain* [Paris: Agasse, 1795, pp. 327–8].[a]

[a–a]MS, 43, 46 "Une propriété fondamentale que je dois faire remarquer dès ce moment dans ce que j'ai appelé la philosophie positive, et qui doit sans doute lui mériter plus que toute autre l'attention générale, puisqu'elle est aujourd'hui la plus importante pour la pratique, c'est qu'elle peut être considérée comme la seule base solide de la réorganisation sociale qui doit terminer l'état de crise dans lequel se trouvent depuis si long-temps les nations les plus civilisées. . . . Tant que les intelligences individuelles n'auront pas adhéré par un assentiment unanime à un certain nombre d'idées générales capables de former une doctrine sociale commune, on ne peut se dissimuler que l'état des nations restera, de toute nécessité, essentiellement révolutionnaire, malgré tous les palliatifs politiques qui pourront être adoptés, et ne comportera réellement que des institutions provisoires. Il est également certain que si cette réunion des esprits dans une même communion de principes peut une fois être obtenue, les institutions convenables en découleront nécessairement, sans donner lieu à aucune secousse grave, le plus grand désordre étant déjà dissipé par ce seul fait." Comte, *Cours de Philosophie Positive,* 1re leçon [Vol. I, pp. 47–8, 49].

CHAPTER I

Introductory Remarks

§ 1. [*The backward state of the Moral Sciences can only be remedied by applying to them the methods of Physical Science, duly extended and generalized*] Principles of Evidence and Theories of Method are not to be constructed *à priori*. The laws of our rational faculty, like those of every other natural agency, are only learnt by seeing the agent at work. The earlier achievements of science were made without the conscious observance of any Scientific Method; and we should never have known by what process truth is to be ascertained, if we had not previously ascertained many truths. But it was only the easier problems which could be thus resolved: natural sagacity, when it tried its strength against the more difficult ones, either failed altogether, or if it succeeded here and there in obtaining a solution, had no sure means of convincing others that its solution was correct. In scientific investigation, as in all other works of human skill, the way of [a]obtaining[a] the end is seen as it were instinctively by superior minds in some comparatively simple case, and is then, by judicious generalization, adapted to the variety of complex cases. We learn to do a thing in difficult circumstances, by attending to the manner in which we have spontaneously done the same thing in [b]easier[b] ones.

This truth is exemplified by the history of the various branches of knowledge which have successively, in the ascending order of their complication, assumed the character of sciences; and will doubtless receive fresh confirmation from those, of which the final scientific constitution is yet to come, and which are still abandoned to the uncertainties of vague and popular discussion. Although several other sciences have emerged from this state at a comparatively recent date, none now remain in it except those which relate to man himself, the most complex and most difficult subject of study on which the human mind can be engaged.

Concerning the physical nature of man, as an organized being,—though there is still much uncertainty and much controversy, which can only be terminated by the general acknowledgment and employment of stricter rules of induction than are commonly recognised,—there is, however, a consider-

[a-a]MS, 43, 46, 51, 56 attaining
[b-b]MS, 43, 46, 51, 56 easy

able body of truths which all who have attended to the subject consider to be fully established; nor is there now any radical imperfection in the method observed in this department of science by its most distinguished modern teachers. But the laws of Mind, and, in even a greater degree, those of Society, are so far from having attained a similar state of even partial recognition, that it is still a controversy whether they are capable of becoming subjects of science in the strict sense of the term: and among those who are agreed on this point, there reigns the most irreconcileable diversity on almost every other. Here, therefore, if anywhere, the principles laid down in the preceding Books may be expected to be useful.

If, on matters so much the most important with which human intellect can occupy itself, a more general agreement is ever to exist among thinkers; if what has been pronounced "the proper study of mankind"[*] is not destined to remain the only subject which Philosophy cannot succeed in rescuing from Empiricism; the same [c]process[c] through which the laws of [d]many[d] simpler phenomena have by general acknowledgment been placed beyond dispute, must be consciously and deliberately applied to those more difficult inquiries. If there are some subjects on which the results obtained have finally received the unanimous assent of all who have attended to the proof, and others on which mankind have not yet been equally successful; on which the most sagacious minds have occupied themselves from the earliest date, [e] and have never succeeded in establishing any considerable body of truths, so as to be beyond denial or doubt; it is by generalizing the methods successfully followed in the former inquiries, and [f]adapting[f] them to the latter, that we may hope to remove this blot on the face of science. The remaining chapters are an [g]endeavour[g] to facilitate this most desirable object.

§ 2. [*How far this remedy of the backward state of the Moral Sciences can be attempted in the present work*] In attempting this, I am not unmindful how little can be done towards it in a mere treatise on Logic, or how vague and unsatisfactory all precepts of Method must necessarily appear, when not practically exemplified in the establishment of a body of doctrine. Doubtless, the most effectual [a]mode[a] of showing how the sciences of Ethics and Politics may be constructed, would be to construct them: a task which, it needs

[*Alexander Pope, *Essay on Man*, Epistle II, l. 2; in *Works*, ed. Warton, Vol. III, p. 53.]

[c-c]MS, 43, 46, 51, 56 processes
[d-d]+51, 56, 62, 65, 68, 72
[e]MS, 43, 46 with every assistance except that of a tried scientific method,
[f-f]MS, 43, 46 applying
[g-g]MS, 43, 46 attempt
[a-a]MS, 43 way

scarcely be said, I am not about to undertake. But even if there were no other examples, the memorable one of Bacon would be sufficient to demonstrate, that it is sometimes both possible and useful to point out the way, though without being oneself prepared to adventure far into it. And if more were to be attempted, this at least is not a proper place for the attempt.

In substance, whatever can be done in a work like this for the Logic of the Moral Sciences, has been or ought to have been accomplished in the five preceding Books; to which the present can be only a kind of supplement or appendix, since the methods of investigation applicable to moral and social science must have been [b]already described[b], if I have succeeded in enumerating and characterizing those of science in general. It [c]remains, however,[c] to examine which of those methods are more especially suited to the various branches of moral inquiry; under what peculiar facilities or difficulties they are there employed; how far the unsatisfactory state of those inquiries is owing to a wrong choice of methods, how far to want of skill in the application of right ones; and what degree of ultimate success may be attained or hoped for, by a better choice or more careful employment of logical processes appropriate to the case. In other words, whether moral sciences exist, or can exist; to what degree of perfection they are susceptible of being carried; and by what selection or adaptation of the methods brought to view in the previous part of this work, that degree of perfection is attainable.

At the threshold of this inquiry we are met by an objection, which, if not removed, would be fatal to the attempt to treat human conduct as a subject of science. Are the actions of [d]human beings[d], like all other natural events, subject to invariable laws? Does that constancy of causation, which is the foundation of [e]every[e] scientific theory of successive phenomena, really obtain among them? This is often denied; and for the sake of systematic completeness, if not from any very urgent practical necessity, the question should receive a deliberate answer in this place. We shall devote to the subject a chapter apart.

[b-b]MS, 43, 46 described by implication
[c-c]MS, 43, 46 only remains
[d-d]MS, 43, 46 man
[e-e]MS any

CHAPTER II

Of Liberty and Necessity

§ 1. [*Are human actions subject to the law of causality?*] The question, whether the law of causality applies in the same strict sense to human actions as to other phenomena, is the celebrated controversy concerning the freedom of the will: which, from at least as far back as the time of Pelagius, has divided both the philosophical and the religious world. The affirmative opinion is commonly called the doctrine of [a] Necessity, as asserting human volitions and actions to be necessary and inevitable. The negative maintains that the will is not determined, like other phenomena, by antecedents; but determines itself; that our volitions are not, properly speaking, the effects of causes, or at least have no causes which they uniformly and implicitly obey.

I have already made it sufficiently [b]apparent[b] that the former of these opinions is that which I consider the true one; but the misleading terms in which it is often expressed, and the indistinct manner in which it is usually apprehended, have both obstructed its reception, and perverted its influence when received. The metaphysical theory of free will, as held by philosophers, (for the practical feeling of it, common in a greater or less degree to all mankind, is in no way inconsistent with the contrary theory,) was invented because the supposed alternative of admitting human actions to be *necessary*, was deemed inconsistent with every one's instinctive consciousness, as well as humiliating to the pride and even degrading to the moral nature of man. Nor do I deny that the doctrine, as sometimes held, is open to these imputations; for the misapprehension in which I shall be able to show that they originate, unfortunately is not confined to the opponents of the doctrine, but [c]is[c] participated in by many, perhaps we might say by most, of its supporters.

§ 2. [*The doctrine commonly called Philosophical Necessity, in what sense true?*] Correctly conceived, the doctrine called Philosophical Necessity is simply this: that, given the motives which are present to an individual's mind, and given likewise the character and disposition of the individual, the

[a] MS philosophical
[b–b]MS, 43, 46, 51 appear
[c–c]+72

manner in which he [a] will act [b]might[b] be unerringly inferred: that if we knew the person thoroughly, and knew all the inducements which are acting upon him, we could foretell his conduct with as much certainty as we can predict any physical event. This proposition I take to be a mere interpretation of universal experience, a statement in words of what every one is internally convinced of. No one who believed that he knew thoroughly the circumstances of any case, and the characters of the different persons concerned, would hesitate to foretell how all of them would act. Whatever degree of doubt he may in fact feel, arises from the uncertainty whether he really knows the circumstances, or the character of some one or other of the persons, with the degree of accuracy required: but by no means from thinking that if he did know these things, there could be any uncertainty what the conduct would be. Nor does this full assurance conflict in the smallest degree with what is called our feeling of freedom. We do not feel ourselves the less free, because those to whom we are intimately known are well assured how we shall will to act in a particular case. We often, on the contrary, regard the doubt what our conduct will be, as a mark of ignorance of our character, and sometimes even resent it as an imputation. [c]The religious metaphysicians who have asserted the freedom of the will, have always maintained it to be consistent with divine foreknowledge of our actions: and if with divine, then with any other foreknowledge.[c] We may be free, and yet another may have reason to be perfectly certain what use we shall make of our freedom. It is not, therefore, the doctrine that our volitions and actions are invariable consequents of our antecedent states of mind, that is either contradicted by our consciousness, or felt to be degrading.

But the doctrine of causation, when considered as obtaining between our volitions and their antecedents, is almost universally conceived as involving more than this. Many do not believe, and very few practically feel, that there is nothing in causation but invariable, certain, and unconditional sequence. There are few to whom mere constancy of succession appears a sufficiently stringent bond of union for so peculiar a relation as that of cause and effect. Even if the reason repudiates, [d]the[d] imagination retains, the feeling of some

[a]51, 56 [*footnote:*] *The pronoun *he* is the only one available to express all human beings; none having yet been invented to serve the purpose of designating them generally, without distinguishing them by a characteristic so little worthy of being made the main distinction as that of sex. This is more than a defect in language; tending greatly to prolong the almost universal habit, of thinking and speaking of one-half the human species as the whole.

[b-b]MS, 43, 46, 51, 56, 62, 65 may

[c-c]MS, 43 It has never been admitted by the religious philosophers who advocated the free-will doctrine, that we must feel not free because God foreknows our actions.] 46 It has never been held by . . . *as* MS

[d-d]+56, 62, 65, 68, 72

more intimate connexion, of some peculiar tie, or mysterious constraint exercised by the antecedent over the consequent. Now this it is which, considered as applying to the human will, conflicts with our consciousness, and revolts our feelings. We are certain that, in the case of our volitions, there is not this mysterious constraint. We know that we are not compelled, as by a magical spell, to obey any particular motive. We feel, that if we wished to prove that we have the power of resisting the motive, we could do so, (that wish being, it needs scarcely be observed, a *new antecedent*;) and it would be humiliating to our pride, and [e](what is of more importance)[e] paralysing to our desire of excellence, if we thought otherwise. But neither is any such mysterious compulsion now supposed, by the best philosophical authorities, to be exercised by [f]any other[f] cause over its effect. Those who think that causes draw their effects after them by a mystical tie, are right in believing that the relation between volitions and their antecedents is of another nature. But they should go farther, and admit that this is also true of all other effects and their antecedents. If such a tie is considered to be involved in the word necessity, the doctrine is not true of human actions; but neither is it then true of inanimate objects. It would be more correct to say that matter is not bound by necessity, than that mind is so.

That the free-will [g]metaphysicians[g], being mostly of the school which rejects Hume's and Brown's analysis of Cause and Effect, should miss their way for want of the light which that analysis affords, cannot surprise us. The wonder is, that the [h]necessitarians[h], who usually admit that philosophical theory, should in practice equally lose sight of it. The very same misconception of the doctrine called Philosophical Necessity, which prevents the opposite party from recognising its truth, I believe to exist more or less obscurely in the minds of most necessitarians, [i]however[i] they may in words disavow it. I am much mistaken if they habitually feel that the necessity which they recognise in actions is but uniformity of order, and capability of being predicted. They have a feeling as if there were at bottom a stronger tie between the volitions and their causes: as if, when they asserted that [j]the[j] will is governed by the balance of motives, they meant something more cogent than if they had only said, that whoever knew the motives, and our habitual susceptibilities to them, could predict how we should will to act. They commit, in opposition to their own [k]scientific[k] system, the very same mistake

[e-e]+68, 72
[f-f]MS, 43, 46, 51, 56, 62, 65 *any*
[g-g]MS, 43, 46 philosophers
[h-h]MS, 43, 46, 51, 56, 62, 65, 68 necessarians [*in* 72 necessitarian(s) *was substituted for* necessarian(s) *in all cases in this and the next section; not henceforth recorded*]
[i-i]MS howsoever [*printer's error?*]
[j-j]MS, 43, 46 our
[k-k]MS, 43, 46 philosophical

which their adversaries commit in obedience to theirs; and in consequence do really in some instances [l] suffer those depressing consequences, which their opponents erroneously impute to the doctrine itself.

§ 3. [*Inappropriateness and pernicious effect of the term Necessity*] I am inclined to think that this error is almost wholly an effect of the associations with a word; and that it would be prevented, by forbearing to employ, for the expression of the simple fact of causation, so extremely inappropriate a term as Necessity. That word, in its other acceptations, involves much more than mere uniformity of sequence: it implies irresistibleness. Applied to the will, it only means that the given cause will be followed by the effect, subject to all possibilities of counteraction by other causes: but in common use it stands for the operation of those causes exclusively, which are supposed too powerful to be counteracted at all. When we say that all human actions take place of necessity, we only mean that they will certainly happen if nothing prevents:—when we say that dying of want, to those who cannot get food, is a necessity, we mean that it will certainly happen whatever may be done to prevent it. The application of the same term to the agencies on which human actions depend, as is used to express those agencies of nature which are really uncontrollable, cannot fail, when habitual, to create a feeling of uncontrollableness in the former also. This however is a mere illusion. There are physical sequences which we call necessary, as death for want of food or air; there are others which [a], though as much cases of causation as the former,[a] are not said to be necessary, as death from poison, which an antidote, or the use of the stomach-pump, will sometimes avert. It is apt to be forgotten by people's feelings, even if remembered by their understandings, that human actions are in this last predicament: they are never (except in some cases of mania) ruled by any one motive with such absolute sway, that there is no room for the influence of any other. The causes, therefore, on which action depends, are never uncontrollable; and any given effect is only necessary provided that the causes tending to produce it are not controlled. That whatever happens, could not have happened otherwise unless something had taken place which was capable of preventing it, no one surely needs hesitate to admit. But to call this by the name necessity is to use the term in a sense so different from its primitive and familiar meaning, from that which it bears in the common occasions of life, as to amount almost to a play upon words. The associations derived from the ordinary sense of the term will adhere to it in spite of all we can do: and though the doctrine of Necessity, as stated by most who hold it, is very remote from fatalism, it is probable that most necessitarians are fatalists, more or less, in their feelings.

[l]MS, 43, 46 (I speak from personal experience)
[a-a]+65, 68, 72

A fatalist believes, or half believes (for nobody is a consistent fatalist), not only that whatever is about to happen, will be the infallible result of the causes which produce it, (which is the true necessitarian doctrine), but moreover that there is no use in struggling against it; that it will happen however we may strive to prevent it. Now, a necessitarian, believing that our actions follow from our characters, and that our characters follow from our organization, our education, and our circumstances, is apt to be, with more or less of consciousness on his part, a fatalist as to his own actions, and to believe that his nature is such, or that his education and circumstances have so moulded his character, that nothing can now prevent him from feeling and acting in a particular way, or at least that no effort of his own can hinder it. In the words of the sect which in our own day has [b]most perseveringly inculcated and most[b] perversely misunderstood this great doctrine, his character is formed *for* him, [c]and[c] not *by* him; therefore his wishing that it had been formed differently is of no use; he has no power to alter it. But this is a grand error. He has, to a certain extent, a power to alter his character. Its being, in the ultimate resort, formed for him, is not inconsistent with its being, in part, formed *by* him as one of the intermediate agents. His character is formed by his circumstances (including among these his particular organization); but his own desire to mould it in a particular way, is one of those circumstances, and by no means [d]one of the least influential[d]. We cannot, indeed, directly will to be different from what we are. But neither did those who are supposed to have formed our characters, directly will that we should be what we are. Their will had no direct power except over their own actions. They made us what they did make us, by willing, not the end, but the requisite means; and we, when our habits are not too inveterate, can, by similarly willing the requisite means, make ourselves different. If they could place us under the influence of certain circumstances, we, in like manner, can place ourselves under the influence of other circumstances. We are exactly as capable of making our own character, *if we will*, as others are of making it for us.

Yes (answers the Owenite), but these words, "if we will," surrender the whole point: since the will to alter our own character is given us, not by any efforts of ours, but by circumstances which we cannot help; it comes to us either from external causes, or not at all. Most true: if the Owenite stops here, he is in a position from which nothing can expel him. Our character is formed by us as well as for us; but the wish which induces us to attempt to form it is formed for us; and how? Not, in general, by our organization [e],

[b–b]MS, 43, 46 so perseveringly inculcated and so
[c–c]+43, 46, 51, 56, 62, 65, 68, 72
[d–d]MS the least influential among them
[e–e]MS, 43 or] 46 , nor merely by our

nor wholly by our[e] education, but by our experience; experience of the painful consequences of the character we previously had: or by some strong feeling of admiration or aspiration, accidentally aroused. But to think that we have no power of altering our [f]character[f], and to think that we shall not use our power unless we [g]desire to use it[g], are very different things, and have a very different effect on the mind. A person who does not wish to alter his character, cannot be the person who is supposed to feel discouraged or paralysed by thinking himself unable to do it. The depressing effect of the fatalist doctrine can only be felt where there *is* a wish to do what that doctrine represents as impossible. It is of no consequence what we think forms our character, when we have no desire of our own about forming it; but it is of great consequence that we should not be prevented from forming such a desire by thinking the attainment impracticable, and that if we have the desire, we should know that the work is not so irrevocably done as to be incapable of being altered.

And indeed, if we examine closely, we shall find that this feeling, of our being able to modify our own character *if we wish*, is itself the feeling of moral freedom which we are conscious of. A person feels morally free who feels that his habits or his temptations are not his masters, but he theirs: who even in yielding to them knows that he could resist; that were he [h] desirous of altogether throwing them off, there would not be required for that purpose a stronger desire than he knows himself to be capable of feeling. It is of course necessary, to render our consciousness of freedom complete, that we should [i]have succeeded in making[i] our character all we have hitherto [j]attempted[j] to make it; for if we have wished and not attained, we have [k], to that extent,[k] not power over our own character, [l]we are not free. Or at least, we must feel that our wish, if not strong enough to alter our character, is strong enough to conquer our character when the two are brought into conflict in any particular case of conduct. [m]And hence it is said with truth, that none but a person of confirmed virtue is completely free.[m]

The application of so improper a term as Necessity to the doctrine of cause and effect in the matter of human character, seems to me one of the most signal instances in philosophy of the abuse of terms, and its practical consequences one of the most striking examples of the power of language over our associations. The subject will never be generally understood, until that objectionable term is dropped. The free-will doctrine, by keeping in view precisely that portion of the truth which the word Necessity puts out of sight, namely the power of the mind to co-operate in the formation of its own

[f–f]MS, 43 characters
[h]MS, 43, 46 , for any reason,
[j–j]MS, 43, 46 wished
[l]MS & [*? folio torn*]
[g–g]MS, 43, 46 have a motive
[i–i]MS, 43, 46 actually have made
[k–k]+65, 68, 72
[m–m]+68, 72

character, has given to its adherents a practical feeling much nearer to the truth than has generally (I believe) existed in the minds of necessitarians. The latter may have had a stronger sense of the importance of what human beings can do to shape the characters of one another; but the free-will doctrine has, I believe, fostered [n]in its supporters[n] a much stronger spirit of self-culture.

§ 4. [*A motive not always the anticipation of a pleasure or pain*] There is still one fact which requires to be noticed (in addition to the existence of a power of self-formation) before the doctrine of the causation of human actions can be freed from the confusion and misapprehensions which surround it in many minds. When the will is said to be determined by motives, a motive does not mean always, or solely, the anticipation of a pleasure or of a pain. I shall not here inquire whether it be true that, in the commencement, all our voluntary actions are mere means consciously employed to obtain some pleasure, or avoid some pain. It is at least certain that we gradually, through the influence of association, come to desire the means without thinking of the end: the action itself becomes an object of desire, and is performed without reference to any motive beyond itself. Thus far, it may still be objected, that, the action having through association become pleasurable, we are, as much as before, moved to act by the anticipation of a pleasure, namely, the pleasure of the action itself. But granting this, the matter does not end here. As we proceed in the formation of habits, and become accustomed to will a particular act or a particular course of conduct because it is pleasurable, we at last continue to will it [a]without any reference to its being pleasurable[a]. Although, from some change in us or in our circumstances, we have ceased to find any pleasure in the action, or [b]perhaps[b] to anticipate any pleasure as the consequence of it, we still continue to desire the action, and consequently to do it. In this manner it is that habits of hurtful [c]excess[c] continue to be practised although they have ceased to be pleasurable; and in this manner also it is that the habit of willing to persevere in [d]the course which he has chosen,[d] does not desert the moral hero, even when the reward, however real, which he doubtless receives from the consciousness of well-doing, is anything but an equivalent for the sufferings he undergoes, or the [e] wishes which he may have to renounce.

A habit of willing is commonly called a purpose; and among the causes of our volitions, and of the actions which flow from them, must be reckoned not only likings and aversions, but also purposes. It is only when our pur-

[n-n]MS, 43, 46 , especially in the younger of its supporters,
[a-a]MS, 43, 46 whether it is pleasurable or not
[b-b]+51, 56, 62, 65, 68, 72
[c-c]MS, 43, 46 indulgence
[d-d]MS, 43, 46 a prescribed course
[e]MS cherished

poses have become independent of the feelings of pain or pleasure from which they originally took their rise, that we are said to have a confirmed character. "A character," says Novalis, "is a completely fashioned will:"[*] and the will, once so fashioned, may be steady and constant, when the passive susceptibilities of pleasure and pain are greatly weakened, or materially changed.

With the corrections and explanations now given, the doctrine of the causation of our volitions by motives, and of motives by the desirable objects offered to us, combined with our particular susceptibilities of desire, may be considered, I hope, as sufficiently established [f]for the purposes of this treatise[f].*

[*See Thomas Carlyle. "Novalis," *Critical and Miscellaneous Essays*. 5 vols. London: Fraser, 1840, Vol. II, p. 242.]

*[65] Some arguments and explanations, supplementary to those in the text, will be found in *An Examination of Sir William Hamilton's Philosophy*, Chap. xxvi. — on punishment

[f-f]MS, 43, 46 ; and I shall henceforth assume its truth without any further discussion

CHAPTER III

That There is, or May Be, a Science of Human Nature

§ 1. *[There may be sciences which are not exact sciences]* It is a common notion, or at least it is implied in many common modes of speech, that the thoughts, feelings, and actions of sentient beings are not a subject of science, in the same strict sense in which this is true of the objects of outward nature. This notion seems to involve some confusion of ideas, which it is necessary to begin by clearing up.

Any facts are fitted, in themselves, to be a subject of science, which follow one another according to constant laws; although those laws may not have been discovered, nor even be discoverable by our existing resources. Take, for instance, the most familiar class of meteorological phenomena, those of rain and sunshine. Scientific inquiry has not yet succeeded in ascertaining the order of antecedence and consequence among these phenomena, so as to be able, at least in our regions of the earth, to predict them with certainty, or even with any high degree of probability. Yet no one doubts that the phenomena depend on laws, and that these must be derivative laws resulting from known ultimate laws, those of heat, [a]electricity,[a] vaporization, and elastic fluids. Nor can it be doubted that if we were acquainted with all the antecedent circumstances, we could, even from those more general laws, predict (saving difficulties of calculation) the state of the weather at any future time. Meteorology, therefore, not only has in itself every natural requisite for being, but actually is, a science; though, from the difficulty of observing the facts on which the phenomena depend (a difficulty inherent in the peculiar nature of those phenomena) the science is [b]extremely[b] imperfect; and were it perfect, might probably be of little avail in practice, since the data requisite for applying its principles to particular instances would rarely be procurable.

A case may be conceived, of an intermediate character between the perfection of science, and this its extreme imperfection. It may happen that the greater causes, those on which the principal part of [c]the phenomena[c] depends,

[a–a]+68, 72
[b–b]MS, 43, 46 still very
[c–c]MS, 43, 46, 51 a phenomenon] 56 the phenomenon

are within the reach of observation and measurement; so that if no other causes intervened, a complete explanation could be given not only of the phenomenon in general, but of all the variations and modifications which it [d]admits[d] of. But inasmuch as other, perhaps many other causes, separately insignificant in their effects, co-operate or conflict in many or in all cases with those greater causes; the effect, accordingly, presents more or less of aberration from what would be produced by the greater causes alone. Now if these minor causes are not so constantly accessible, or not accessible at all, to accurate observation; the principal mass of the effect may still, as before, be accounted for, and even predicted; but there will be variations and modifications which we [e]shall not be[e] competent to explain thoroughly, and our predictions will not be fulfilled accurately, but only approximately.

It is thus, for example, with the theory of the tides. No one doubts that Tidology (as Dr. Whewell proposes to call it)[*] is really a science. As much of the phenomena as depends on the attraction of the sun and moon is completely understood, and may in any, even unknown, part of the earth's surface, be foretold with certainty; and the far greater part of the phenomena depends on those causes. But circumstances of a local or casual nature, such as the configuration of the bottom of the ocean, the degree of confinement from shores, the direction of the wind, &c., influence, in many or in all places, the height and time of the tide; and a portion of these circumstances being either not accurately knowable, not precisely measurable, or [f] not capable of being certainly foreseen, the tide in known places commonly varies from the calculated result of general principles by some difference that we cannot explain, and in unknown ones may vary from it by a difference that we are not able to foresee or conjecture. Nevertheless, not only is it certain that these variations depend on causes, and follow their causes by laws of unerring uniformity; not only, therefore, is tidology a science, like meteorology, but it is, what [g]hitherto at least meteorology is not[g], a science largely available in practice. General laws may be laid down respecting the tides, predictions may be founded on those laws, and the result will in the main, though often not with complete accuracy, correspond to the predictions.

And this is what is or ought to be meant by those who speak of sciences which are not *exact* sciences. Astronomy was once a science, without being an exact science. It could not become exact until not only the general course of the planetary motions, but the perturbations also, were accounted for, and referred to their causes. It has [h] become an exact science, because its pheno-

[*Novum Organon Renovatum*, p. 330.]

[d-d]MS, 43, 46, 51 admitted   [e-e]MS, 43, 46 are not
[f]MS, 43, 46, 51, 56, 62, 65 at least
[g-g]MS, 43, 46 meteorology perhaps will never be
[h]MS, 43, 46 now

mena have been brought under laws comprehending the whole of the causes by which the phenomena are influenced, whether in a great or only in a trifling degree, whether in all or only in some cases, and assigning to each of those causes the share of effect which really belongs to it. But in [i]the theory of the tides[i] the only laws as yet accurately ascertained, are those of the causes which affect the phenomenon in all cases, and in a considerable degree; while others which affect it in some cases only, or, if in all, only in a slight degree, have not [j] been sufficiently ascertained and studied to enable us to lay down their laws; still less to deduce the completed law of the phenomenon, by compounding the effects of the greater with those of the minor causes. Tidology, therefore, is not yet an exact science; not from any inherent incapacity of being so, but from the difficulty of ascertaining with complete precision the real derivative uniformities. By combining, however, the exact laws of the greater causes, and of such of the minor ones as are sufficiently known, with such empirical laws or such approximate generalizations [k]respecting[k] the miscellaneous variations as can be obtained by specific observation, we can lay down general propositions which will be true in the main, and on which, with allowance for the degree of their probable inaccuracy, we may safely ground our expectations and our conduct.

§ 2. [*To what scientific type the Science of Human Nature corresponds*] The science of human nature is of this description. It falls far short of the standard of exactness now realized in Astronomy; but there is no reason that it should not be as much a science as Tidology is, or as Astronomy was when its calculations had only mastered the main phenomena, but not the perturbations.

The phenomena with which this science is conversant being the thoughts, feelings, and actions of human beings, it would have attained the ideal perfection of a science if it enabled us to foretell how an individual would think, feel, or act, throughout life, with the same certainty with which astronomy enables us to predict the places and the occultations of the heavenly bodies. It needs scarcely be stated that nothing approaching to this can be done. The actions of individuals could not be predicted with scientific accuracy, were it only because we cannot foresee the whole of the circumstances in which those individuals will be placed. But further, even in any given combination of (present) circumstances, no assertion, which is both precise and universally true, can be made respecting the manner in which human beings will think, feel, or act. This is not, however, because every person's modes of thinking, feeling, and acting, do not depend on causes; nor can we doubt

[i-i]MS, 43 tidology
[j]43, 46 yet [*printer's error? cancelled in* MS]
[k-k]MS on the subject of

that if, in the case of any individual, our data could be complete, we even now know enough of the ultimate laws by which mental phenomena are determined, to enable us [a]in many cases[a] to predict, with tolerable certainty, [b]what, in the greater number of supposable combinations[b] of circumstances, his conduct or sentiments would be. But the impressions and actions of human beings are not solely the result of their present circumstances, [c]but[c] the joint result of those circumstances and of the characters of the individuals: and the agencies which determine human character are so numerous and diversified, (nothing which has happened to the person throughout life being without its portion of influence,) that in the aggregate they are never in any two cases exactly similar. Hence, even if our science of human nature were theoretically perfect, that is, if we could calculate any character as we can calculate the orbit of any planet, *from given data*; still, as the data are never all given, nor ever precisely alike in different cases, we could neither make [d]positive[d] predictions, nor lay down universal propositions.

Inasmuch, however, as many of those effects which it is of most importance to render amenable to human foresight and control are determined, like the tides, in an incomparably greater degree by general causes, than by all partial causes taken together; depending in the main on those circumstances and [e] qualities which are common to all mankind, or [f] at least to large bodies of them, and only in a small degree on the idiosyncrasies of organization or the peculiar history of individuals; it is evidently possible with regard to all such effects, to make predictions which will *almost* always be verified, and general propositions which are almost always true. And whenever it is sufficient to know how the great majority of the human race, or of some nation or class of persons, will think, feel, and act, these propositions are equivalent to universal ones. For the purposes of political and social science this *is* sufficient. As we formerly remarked,* an approximate generalization is [g], in social inquiries, for most practical purposes[g] equivalent to an exact one: that which is only probable when asserted of [h]individual human beings indiscriminately selected[h], being certain when affirmed of the character and collective conduct of masses.

It is no disparagement, therefore, to the science of Human Nature, that

*Supra, p. 603.

[a-a]+46, 51, 56, 62, 65, 68, 72
[b-b]MS, 43 if not with perfect precision, what, under any given set] 46 what, under a given set
[c-c]MS they are
[d-d]MS, 43, 46 infallible
[e]MS, 43, 46 those
[f]MS, 43, 46 common
[g-g]MS, 43, 46 practically, in social inquiries,
[h-h]MS, 43, 46 human beings taken individually

those of its general propositions which descend sufficiently into detail to serve as a foundation for predicting phenomena in the concrete, are for the most part only approximately true. But [i]in order[i] to give a genuinely scientific character to the study, it is indispensable that these approximate generalizations, which in themselves would amount only to the lowest kind of empirical laws, should be connected deductively with the laws of nature from which they result; should be resolved into the properties of the causes on which the phenomena depend. In other words, the science of Human Nature may be said to exist, in proportion as [j]the[j] approximate truths, which compose a practical knowledge of mankind, can be exhibited as corollaries from the universal laws of human nature on which they rest; whereby the proper limits of those approximate truths would be shown, and we should be enabled to deduce others for any new state of circumstances, in anticipation of specific experience.

The proposition now stated is the text on which the two succeeding chapters will furnish the comment.

[i-i]+43, 46, 51, 56, 62, 65, 68, 72
[j-j]MS, 43, 46 those

CHAPTER IV

Of the Laws of Mind

§ 1. [*What is meant by Laws of Mind*] What the Mind is, as well as what Matter is, or any other question respecting Things in themselves, as distinguished from their sensible manifestations, it would be foreign to the purposes of this treatise to consider. Here, as throughout our inquiry, we shall keep clear of all speculations respecting the mind's own nature, and shall understand by the laws of mind, those of mental Phenomena; of the various feelings or states of consciousness of sentient beings. These, according to the classification we have uniformly followed, consist of Thoughts, Emotions, Volitions, and Sensations; the last being as truly states of Mind as the three former. It is usual indeed to speak of sensations as states of body, not of mind. But this is the common confusion, of giving one and the same name to a phenomenon and to the proximate cause or conditions of the phenomenon. The immediate antecedent of a sensation is a state of body, but the sensation itself is a state of mind. If the word mind means anything, it means that which feels. [a]Whatever opinion we hold respecting the fundamental identity or diversity of matter and mind, [b]in any case[b] the distinction between mental and physical facts, between the internal and the external world, will always remain, as a matter of classification: and in that classification, sensations, like all other feelings, must be ranked as mental phenomena. The mechanism of their production, both in the body itself and in what is called outward nature, is all that can with any propriety be classed as physical.[a]

The phenomena of mind, then, are the various feelings of our nature, both those [c]improperly[c] called physical, and those peculiarly designated as mental: and by the laws of mind, I mean the laws according to which those feelings generate one another.

§ 2. [*Is there a science of Psychology?*] All states of mind are immediately caused either by other states of mind, or by states of body. When a state of mind is produced by a state of mind, I call the law concerned in the case, a

[a-a]MS, 43, 46 If we allow ourselves to use language implying that the body feels, there is no reason against being consistent in that language, and saying that the body also thinks.

[b-b]+62, 65, 68, 72

[c-c]+51, 56, 62, 65, 68, 72

law of Mind. When a state of mind is produced directly by a state of body, the law is a law of Body, and belongs to physical science.

With regard to those states of mind which are called sensations, all are agreed that these have for their immediate antecedents, states of body. Every sensation has for its proximate cause some affection of the portion of our frame called the nervous system; whether this affection originate in the action of some external object, or in some pathological condition of the nervous organization itself. The laws of this portion of our nature—the varieties of our sensations, and the physical conditions on which they proximately depend—manifestly [a]belong to[a] the province of Physiology.

Whether [b]the remainder[b] of our mental states are similarly dependent on physical conditions, is one of [c]the *vexatæ questiones* in the science of human nature. It is still disputed[c] whether our thoughts, emotions, and volitions are generated through the intervention of material mechanism; whether we have organs of thought and of emotion, in the same sense in which we have organs of sensation. Many eminent physiologists hold the affirmative. These contend that a thought (for example) is as much the result of nervous agency, as a sensation: that some particular state of our nervous system, in particular of that central portion of it called the brain, invariably precedes, and is presupposed by, every state of our consciousness. According to this theory, one state of mind is never really produced by another: all are produced by states of body. When one thought seems to call up another by association, it is not really a thought which recals a thought; the association did not exist between the two thoughts, but between the two states of the brain or nerves which preceded the thoughts: one of those states [d]recals[d] the other, each being attended, in its passage, by the particular [e]state of consciousness[e] which is consequent on it. On this [f]theory[f] the uniformities of succession among states of mind would be mere derivative uniformities, resulting from the laws of succession of the bodily states which cause them. There would be no original mental laws, no Laws of Mind in the sense in which I use the term, at all: [g]and[g] mental science would be a mere branch, though the highest and most recondite branch, of the science of physiology. [h]M. Comte, accordingly,[h] claims the scientific cognizance of moral and intellectual phenomena exclusively for physiologists; and not only denies to Psychology, or Mental Philosophy properly so called, the character of a science, but places it, in the

[a-a]MS, 43, 46 fall under
[b-b]MS, 43, 46 any other portion
[c-c]MS, 43, 46 those scientific questions respecting human nature which are still in abeyance. It is yet undecided
[d-d]MS recalled
[e-e]MS, 43, 46 mental state
[f-f]MS shewing
[g-g]MS, 43, 46 but
[h-h]MS, 43 This is what M. Comte must be understood to mean, when he

chimerical nature of its objects and pretensions, almost on a par with astrology.[*]

But, after all has been said which can be said, it remains incontestable [i]that there[i] exist uniformities of succession among states of mind, and that these can be ascertained by observation and experiment. [j]Further, that every mental state has a nervous state for its immediate antecedent and proximate cause, though extremely probable, cannot hitherto be said to be proved, in the conclusive manner in which this can be proved of sensations; and even were it certain,[j] yet every one must admit that we are wholly ignorant of the characteristics of these nervous states; we know not, [k]and at present have no means of knowing[k], in what respect one of them differs from another; and our only mode of studying their successions or coexistences must be by observing the successions and coexistences of the mental states, of which they are supposed to be the generators or causes. The successions, therefore, which obtain among mental phenomena, do not admit of being deduced from the physiological laws of our nervous organization: and all real knowledge of them must continue, for a long time at least, if not [l]always[l], to be sought in the direct study, by observation and experiment, of the mental successions themselves. Since therefore the order of our mental phenomena must be studied in those phenomena, and not inferred from the laws of any phenomena more general, there is a distinct and separate Science of Mind.

[m] The relations, indeed, of that science to the science of physiology must never be overlooked or undervalued. It must by no means be forgotten that the laws of mind may be derivative laws resulting from laws of animal life, and that their truth therefore may ultimately depend on physical conditions; and the influence of physiological states or physiological changes in altering or counteracting the mental successions, is one of the most important departments of psychological study. [n]But, on the other hand, to reject the resource of psychological analysis, and construct the theory of the mind solely on such data as physiology at present affords, seems to me as great an error in principle, and an even more serious one in practice. Imperfect as is the science of mind, I do not scruple to affirm, that it is in a considerably more advanced state than the portion of physiology which corresponds to it; and to discard the former for the latter appears to me an infringement of the true

[*See *Cours*, Vol. III, 43e Leçon.]

[i-i]MS, 43 by M. Comte and by all others, that there do
[j-j]MS, 43, 46 Moreover, even if it were rendered far more certain than I believe it as yet to be, that every mental state has a nervous state for its immediate antecedent and proximate cause;
[k-k]MS, 43, 46 nor can hope to know
[l-l]MS, 43, 46, 51, 56, 62, 65 for ever
[m]MS, 43 [*no paragraph*]
[n-n852]+46, 51, 56, 62, 65, 68, 72

canons of inductive philosophy, which must produce, and which does produce, erroneous conclusions in some very important departments of the science of human nature.[n]

§ 3. [*The principal investigations of Psychology characterized*] The subject, then, of Psychology, is the uniformities of succession, the laws, whether ultimate or derivative, according to which one mental state succeeds another; is caused by, or at [a] least, is caused to follow, another. Of these laws, some are general, others more special. The following are examples of the most general laws.

First: Whenever any state of consciousness has once been excited in us, no matter by what cause; an inferior degree of the same state of consciousness, a state of consciousness resembling the former, but inferior in intensity, is capable of being reproduced in us, without the presence of any such cause as excited it at first. Thus, if we have once seen or touched an object, we can afterwards think of the object though it be absent from our sight or from our touch. If we have been joyful or grieved at some event, we can think of, or remember our past joy or grief, though no new event of a happy or [b] painful nature has taken place. When a poet has put together a mental picture of an imaginary object, a Castle of Indolence, a Una, or a [c]Hamlet[c],[*] he can afterwards think of the ideal object he has created, without any fresh act of intellectual combination. This law is expressed by saying, in the language of Hume, that every mental *impression* has its *idea*.

Secondly: These ideas, or secondary mental states, are excited by our impressions, or by other ideas, according to certain laws which are called Laws of Association. Of these laws the first is, that similar ideas tend to excite one another. The second is, that when two impressions have been frequently experienced (or even thought of) either simultaneously or in immediate succession, then whenever [d]one[d] of [e]these[e] impressions, or the idea of it, recurs, it tends to excite the idea of the other. The third law is, that greater intensity in either or both of the impressions, is equivalent, in rendering them excitable by one another, to a greater frequency of conjunction. These are the laws of ideas: on which I shall not enlarge in this place, but refer the reader to works professedly psychological, in particular to Mr. [f]James[f] Mill's *Analysis of the Phenomena of the Human Mind*, where the

[*The references are to James Thomson, *The Castle of Indolence*; Edmund Spenser, *The Faerie Queene*; and William Shakespeare, *Hamlet* (and, in the variant, *Romeo and Juliet*).]

[a]MS, 43, 46 the
[b]MS, 43 a
[c-c]MS, 43, 46 Juliet
[d-d]MS, 43, 46 either
[e-e]MS those [*printer's error?*]
[f-f]+68, 72

[g]principal[g] laws of association, [h]along with[h] many of their applications, are copiously exemplified, and with a masterly hand.*

These simple or elementary Laws of Mind have [m] been ascertained by the ordinary methods of experimental inquiry; nor could they have been ascertained in any other manner. But a certain number of elementary laws having thus been obtained, it is a fair subject of scientific inquiry how far those laws can be made to go in explaining the actual phenomena. It is obvious that complex laws of thought and feeling not only may, but must, be generated from these simple laws. And it is to be remarked, that the case is not always one of Composition of Causes: the effect of concurring causes is not always precisely the sum of the effects of those causes when separate, nor even always an effect of the same kind with them. Reverting to the distinction which occupies so prominent a place in the theory of induction; the laws of the phenomena of mind are sometimes analogous to mechanical, but sometimes also to chemical laws. When many impressions or ideas are operating in the mind together, there sometimes takes place a process of a similar kind to chemical combination. When impressions have been so often experienced in conjunction, that each of them calls up readily and instantaneously the ideas of the whole group, those ideas sometimes melt and coalesce into one another, and appear not several ideas, but one; in the same manner as, when the seven prismatic colours are presented to the eye in rapid succession, the sensation produced is that of white. But as in this last case it is correct to say that the seven colours when they rapidly follow one another *generate* white,

*[56] [i]When this chapter was written, [j]Professor[j] Bain had not yet published even the first part (*The Senses and the Intellect*) of his profound Treatise on the Mind. In this, the laws of association have been more comprehensively stated and more largely exemplified than by any previous writer; and the work, having been completed by the publication of *The Emotions and the Will*, may now be referred to as incomparably the most complete analytical exposition of the mental phenomena, on the basis of a legitimate Induction, which has yet been produced. [k]More recently still, Mr. Bain has joined with me in appending to a new edition of the *Analysis*, notes intended to bring up the analytic science of Mind to its latest improvements.[k]

Many striking applications of the laws of association[i] to the explanation of complex mental phenomena, are also to be found in Mr. [l]Herbert[l] Spencer's *Principles of Psychology*.

[g-g]+43, 46, 51, 56, 62, 65, 68, 72
[h-h]MS, 43, 46 both in themselves and in
[i-i]56 The laws of association have since been still more comprehensively treated and more largely exemplified in *The Senses and the Intellect* by Mr. Bain: and many striking applications of those laws,
[j-j]62, 65, 68 Mr.
[k-k]+72
[l-l]+62, 65, 68, 72
[m]MS, 43, 46 long

but not that they actually *are* white; so it appears to me that the Complex Idea, formed by the blending together of several simpler ones, should, when it really appears simple, (that is, when the separate elements are not consciously distinguishable in it,) be said to *result from*, or *be generated by*, the simple ideas, not to *consist* of them. Our idea of an orange really *consists* of the simple ideas of a certain colour, a certain form, a certain taste and smell, &c., because we can, by interrogating our consciousness, perceive all these elements in the idea. But we cannot perceive, in so apparently simple a feeling as our perception of the shape of an object by the eye, all that multitude of ideas derived from other senses, without which it is well ascertained that no such visual perception would ever have had existence; nor, in our idea of Extension, can we discover those elementary ideas of resistance, derived from our muscular frame, in which [n]it has been conclusively shown[n] that the idea originates. These therefore are cases of mental chemistry: in which it is proper to say that the simple ideas generate, rather than that they compose, the complex ones.

With respect to all the other constituents of the mind, its beliefs, its abstruser conceptions, its sentiments, emotions, and volitions; there are some (among whom are Hartley, and the author of the *Analysis*) who think that the whole of these are generated from simple ideas of sensation, by a chemistry similar to that which we have just exemplified. [o]These philosophers have made out a great part of their case, but I am not satisfied that they have established the whole of it. They have[o] shown that there is such a thing as mental chemistry; that the heterogeneous nature of a feeling A, considered in relation to B and C, is no conclusive argument against its being generated from B and C. Having proved this, they proceed to show, that where A is found, B and C were or may have been present, and why therefore, they [p]ask[p], should not A have been generated from B and C? But even if this evidence were carried to the highest degree of completeness which it admits of; if it were [q]shown (which hitherto it has not, in all cases, been)[q] that certain groups of associated ideas not only might have been, but actually were, present whenever the more recondite mental feeling was experienced;

[n-n]MS Dr. Thomas Brown has rendered it highly probable] 43, 46 Dr. Brown . . . *as* MS] 51 Dr. Brown has shown it to be highly probable] 56, 62 Dr. Brown and others have shown [*see* Thomas Brown, *Lectures on the Philosophy of the Human Mind*, Vol. I, pp. 488ff.]

[o-o]MS, 43 I am unable to satisfy myself that this conclusion is, in the present state of our knowledge, fully made out. In many cases I cannot even perceive, that the line of argument adopted has much tendency to establish it. The philosophers to whom I have referred have, indeed, conclusively] 46, 51, 56, 62, 65 *as* MS . . . establish it. Those philosophers have, indeed, conclusively

[p-p]MS, 43, 46 say

[q-q]MS, 43, 46 shown] 51, 56 shown (which hitherto it is not)] 62, 65 *as* 51 . . . it has not been)

this would amount only to the Method of Agreement, and could not prove causation until confirmed by the more conclusive evidence of the Method of Difference. If the question be whether Belief is a mere case of close association of ideas, it would be necessary to examine experimentally if it be true that any ideas whatever, provided they are associated [r]with the required degree of closeness,[r] give rise to belief. If the inquiry be into the origin of moral feelings, the [s]feeling[s] for example of moral reprobation, [t]it is necessary[t] to compare all the varieties of actions or states of mind which are ever morally disapproved, and see whether in all these cases it can be shown [u], or reasonably surmised,[u] that the action or state of mind had become connected by association, in the disapproving mind, with some particular class of hateful or disgusting ideas; and the method employed is, thus far, that of Agreement. But this is not enough. Supposing this proved, we must try further by the Method of Difference, whether this particular kind of hateful or disgusting ideas, when it becomes associated with an action previously indifferent, will render that action a subject of moral disapproval. If this question can be answered in the affirmative, it is shown to be a law of the human mind, that an association of that particular description is the generating cause of moral reprobation. [v]That all this is the case has been rendered extremely probable, but the experiments have not been tried with the degree of precision necessary for a complete and absolutely conclusive induction.[v]*

It is further to be remembered, that even if all which this theory of mental phenomena contends for could be proved, we should not be the more enabled to resolve the laws of the more complex feelings into those of the simpler ones. The generation of one class of mental phenomena from another, whenever it can be made out, is a highly interesting fact in psychological chemistry; but it no more supersedes the necessity of an experimental study of the generated phenomenon, than a knowledge of the properties of

*[65] In the case of the moral sentiments the place of direct experiment is to a considerable extent supplied by historical experience, and we are able to trace with a tolerable approach to certainty the particular associations by which those sentiments are engendered. This has been attempted, so far as respects the sentiment of justice, in a little work by the present author, entitled *Utilitarianism* [London: Parker, 1863 (periodical version in instalments in *Fraser's Magazine*, LXIV [1861]). In *Collected Works*, Vol. X, pp. 203–59. JSM is referring specifically to Chap. v, "On the Connexion between Justice and Utility."]

[r-r]MS, 43, 46 together with . . . closeness, are sufficient to

[s-s]MS, 43, 46 feelings

[t-t]MS, 43, 46, 51, 56, 62, 65 the first step must be

[u-u]+68, 72

[v-v]MS, 43, 46, 51, 56, 62, 65 But these experiments have either never been tried, or never with the degree of precision indispensable for conclusiveness; and, considering the difficulty of accurate experimentation upon the human mind, it will probably be long before they are so.

oxygen and sulphur enables us to deduce those of sulphuric acid without specific observation and experiment. Whatever, therefore, may be the final issue of the attempt to account for the origin of our judgments, our desires, [w]or our volitions,[w] from simpler mental phenomena, it is not the less imperative to ascertain the sequences of the complex phenomena themselves, by special study in conformity to the canons of Induction. Thus, in respect [x]to[x] Belief, [y]psychologists[y] will always have to inquire, what beliefs we have [z]by direct consciousness[z], and according to what laws one belief produces another; [a]what are[a] the laws, in virtue of which one thing is recognised by the mind, either rightly or erroneously, as evidence of another thing. In regard to Desire, [b]they will have to[b] examine what objects we desire naturally, and by what causes we are made to desire things originally indifferent, or even disagreeable to us; and so forth. It may be remarked, that the general laws of association prevail among [c]these[c] more intricate states of mind, in the same manner as among the simpler ones. A desire, an emotion, an idea of the higher order of abstraction, even our judgments and volitions when they have become habitual, are called up by association, according to precisely the same laws as our simple ideas.

§ 4. [*Relation of mental facts to physical conditions*] In the course of these inquiries it will be natural and necessary to examine, how far the production of one state of mind by another is influenced by any assignable state of body. The commonest observation shows that different minds are susceptible in very different degrees to the action of the same psychological causes. The idea, for example, of a given desirable object, will excite in different minds very different degrees of intensity of desire. The same subject of meditation, presented to different minds, will excite in them very unequal degrees of intellectual action. These differences of mental susceptibility in different individuals may be, first, original and ultimate facts, or, secondly, they may be consequences of the previous mental history of those individuals, or thirdly and lastly, they may depend on varieties of physical organization. That the previous mental history of the individuals must have some share in producing or in modifying the whole of their [a] mental character, is an inevitable consequence of the laws of mind; but that differences of bodily structure also co-operate, is the [b]opinion of all physiologists, confirmed by common experience. It is to be regretted that hitherto this ex-

[w-w]MS our volitions, &c.
[x-x]43, 46 of [*printer's error?*]
[y-y]MS, 43, 46 the psychologist
[z-z]MS, 43, 46 intuitively
[a-a]MS that is,
[b-b]MS, 43, 46 he will
[c-c]MS those
[a]MS, 43, 46 present
[b-b]MS, 43, 46 assertion not only of phrenologists, but, to a greater or less extent, of all physiologists who lay any stress upon the magnitude of the hemispheres of the

perience, being accepted in the gross, without due analysis, has been made the groundwork of empirical generalizations most detrimental to the progress of real knowledge.[b]

It is certain that the natural differences which really exist in the mental predispositions or susceptibilities of different persons, are often not unconnected with diversities in their organic constitution. But it does not therefore follow that these organic differences must in all cases influence the mental phenomena directly and immediately. They [c] often affect them through the medium of their psychological causes. For example, the idea of some particular pleasure may excite in different persons, even independently of habit or education, very different strengths of desire, and this may be the effect of their different degrees or kinds of nervous susceptibility; but these organic differences, we must remember, will render the pleasurable sensation itself more intense in one of these persons than in the other; so that the idea of the pleasure will also be an intenser feeling, and will, by the operation of mere mental laws, excite an intenser desire, without its being necessary to suppose that the desire itself is directly influenced by the physical peculiarity. As in this, so in many [d] cases, such differences in the kind or in the intensity of the physical sensations as must necessarily result from differences of bodily organization, will of themselves account for many differences not only in the degree, but even in the kind, of the other mental phenomena. So true is this, that even different [e]*qualities*[e] of mind, different types of mental character, will naturally be produced by mere differences [f]of[f] intensity in the sensations generally [g]: as is well pointed out in [h]the able essay on Dr. Priestley, by Mr. Martineau,[h] mentioned in a former chapter[g]:

The sensations which form the elements of all knowledge are received either simultaneously or successively; when several are received simultaneously, as the smell, the taste, the colour, the form, &c. of a fruit, their association together constitutes our idea of an *object*; when received successively, their association makes

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brain, indicated by the facial angle, as a measure of natural intelligence, or upon temperament as a source of moral and emotional peculiarities.

What portion of these assertions the physiological school of psychologists, whether phrenologists or otherwise, have either succeeded in establishing, or shown ground for supposing it possible to establish hereafter, I would not undertake to say. Nor do I believe that the inquiry will be brought to a satisfactory issue, while it is abandoned, as unfortunately it has hitherto been, to physiologists who have no adequate knowledge of mental laws, or psychologists who have no sufficient acquaintance with physiology.

[c]MS, 43 may

[d]MS other

[e-e]MS *kinds*

[f-f]51, 56, 62, 65 in

[g-g]MS, 43, 46 . This is so well exemplified, and in so short a compass, in a very able essay on Dr. Priestley, mentioned in a former chapter, that I think it right to quote the passage

[h-h]51, 56, 62, 65, 68 an able essay on Dr. Priestley,

up the idea of an *event.* Anything, then, which favours the associations of synchronous ideas, will tend to produce a knowledge of objects, a perception of qualities; while anything which favours association in the successive order, will tend to produce a knowledge of events, of the order of occurrences, and of the connexion of cause and effect: in other words, in the one case a perceptive mind, with a ⁱdiscriminateⁱ feeling of the pleasurable and painful properties of things, a sense of the grand and the beautiful, will be the result: in the other, a mind attentive to the movements and phenomena, a ratiocinative and philosophic intellect. Now it is an acknowledged principle, that all sensations experienced during the presence of any vivid impression, become strongly associated with it, and with each other; and does it not follow, that the synchronous feelings of a sensitive constitution (*i.e.* the one which has vivid impressions,) will be more intimately blended than in a differently formed mind? If this suggestion has any foundation in truth, it leads to an inference not unimportant; that where nature has endowed an individual with great original susceptibility, he will probably be distinguished by fondness for natural history, a relish for the beautiful and great, and moral enthusiasm; where there is but a mediocrity of sensibility, a love of science, of abstract truth, with a deficiency of taste and of fervour, is likely to be the result.[*]

We see from this example, that when the general laws of mind are more accurately known, and above all, more skilfully applied to the detailed explanation of mental peculiarities, they will account for many more of those peculiarities than is ordinarily supposed. ʲUnfortunately the reaction of the last and present generation against the philosophy of the eighteenth century has produced a very general neglect of this great department of analytical

[*"On the Life, Character, and Works of Dr. Priestley," *Monthly Repository*, n.s. VII (April, 1833), p. 240.]

ⁱ⁻ⁱSource, MS, 43, 46 discriminative

ʲ⁻ʲMS, 43 I by no means seek to imply from this that they will account for all; but that which remains to be otherwise accounted for is merely a residual phenomenon; and the amount of the residue can only be determined by persons already familiar with the explanation of phenomena by psychological laws.

On the other hand, it is equally clear that when physiologists, taking into account the whole animal creation, attempt, by a judicious application of the Method of Concomitant Variations, grounded chiefly on extreme cases, to establish a connexion between the strength of different mental propensities or capacities and the proportional or absolute magnitudes of different regions of the brain; the evidences which are or may be produced in support of this pretension, ought to be taken into serious consideration by psychologists. Nor will this part of the science of mind be ever cleared up, until those evidences shall be not only sifted and analyzed, but when necessary, added to and completed, by persons sufficiently versed in psychological laws to be capable of discriminating how much of each phenomenon such laws will suffice to explain.

Even admitting the influence of cerebral conformation to be as great as is contended for, it would still be a question how far the cerebral development determined the propensity itself, and how far it only acted by modifying the nature and degree of the sensations on which the propensity may be psychologically dependent. And it is certain that, in human beings at least, differences in education and in outward circumstances, together with physical differences in the sensations produced in different individuals by the same external or internal cause, are capable of accounting for a far greater portion of character than is supposed even by the most moderate phrenologists.] 46 *as* MS . . . or absolute magnitude of the brain or any of its parts; the evidences . . . *as* MS

inquiry; of which, consequently, the recent progress has been by no means proportional to its early promise. The majority of those who speculate on human nature, prefer dogmatically to assume that the mental differences which they perceive, or think they perceive, among human beings, are ultimate facts, incapable of being either explained or altered, rather than take the trouble of fitting themselves, by the requisite processes of thought, for referring those mental differences to the outward causes by which they are for the most part produced, and on the removal of which they would cease to exist. The German school of metaphysical speculation, which has not yet lost its temporary predominance in European thought, has had this among many other injurious influences: and at the opposite extreme of the psychological scale, no writer, either of early or of recent date, is chargeable in a higher degree with this aberration from the true scientific spirit, than M. Comte.

It is certain that, in human beings at least, differences in education and in outward circumstances are capable of affording an adequate explanation of by far the greatest portion of character; and that the remainder may be in great part accounted for by physical differences in the sensations produced in different individuals by the same external or internal cause.[j] There are, however, [k]some[k] mental facts which do not seem to admit of [l]these modes[l] of explanation. Such, to take the strongest case, are the various instincts of animals, [m]and the[m] portion of human nature which corresponds to [n]those instincts[n]. No mode has been suggested, even by way of hypothesis, in which these [o] can receive any satisfactory, or even plausible, explanation from psychological causes alone; and [p]there is [q]great[q] reason to think that they[p] have as positive, and even [r] as direct and immediate, a connexion with physical conditions of the brain and nerves, as any of our mere sensations have. [s]A supposition which (it is perhaps not superfluous to add) in no way conflicts with the indisputable fact, that these instincts may be modified to any extent, or entirely conquered, in human beings [t], and to no inconsiderable extent even in some of the domesticated animals,[t] by other mental influences, and by education.

[k–k]MS, 43, 46 many
[l–l]MS, 43, 46 this mode
[m–m]MS and that] 43 the
[n–n]MS them
[o]MS instincts
[p–p]MS, 43, 46 they may probably be found to
[q–q]51, 56, 62, 65 considerable
[r]MS, 43, 46 perhaps
[s–s860]MS, 43, 46 [*paragraph*] How much further this remark might be extended I do not pretend to determine. My object is not to establish the doctrines, but to discriminate the true Method, of mental science; and this, so far as regards the establishment of the general and elementary laws, may be considered to be sufficiently accomplished.
[t–t]51, 56, 62, 65, 68 at least

Whether organic causes exercise a direct influence over any other classes of mental phenomena, is hitherto as far from being ascertained, as is the precise nature of the organic conditions even in the case of instincts. The physiology, however, of the brain and nervous system is in a state of such rapid advance, and is continually bringing forth such new and interesting results, that if there be really a connexion between mental peculiarities and any varieties cognizable by our senses in the structure of the cerebral and nervous apparatus, the nature of that connexion is now in a fair way of being found out. The latest discoveries in cerebral physiology appear to have proved, that any such connexion which may exist is of a radically different character from that contended for by Gall and his followers, and that whatever may hereafter be found to be the true theory of the subject, phrenology at least is untenable.[s]

CHAPTER V

Of Ethology, or the Science of the Formation of Character

§ 1. [*The Empirical Laws of Human Nature*] The laws of mind as characterized in the preceding chapter, [a]compose[a] the universal or abstract portion of the philosophy of human nature; and all the [b] truths of common experience, constituting a practical knowledge of mankind, must, to the extent to which they are truths, be results or consequences of these. Such familiar maxims, when collected *à posteriori* from observation of life, occupy among the truths of the science the place of what, in our analysis of Induction, have so often been spoken of under the title of Empirical Laws.

An Empirical Law (it will be remembered) is an uniformity, whether of succession or of coexistence, which holds true in all instances within our limits of observation, but is not of a nature to afford any assurance that it would hold beyond those limits; either because the consequent is not really the effect of the antecedent, but forms part along with it of a chain of effects, flowing from prior causes not yet ascertained; or because there is ground to believe that the sequence (though a case of causation) is resolvable into simpler sequences, and, depending therefore on a concurrence of several natural agencies, is exposed to an unknown multitude of possibilities of counteraction. In other words, an empirical law is a generalization, of which, not content with finding it true, we are obliged to ask, why is it true? knowing that its truth is not absolute, but [c]dependent[c] on some more general conditions, and that it can only be relied on in so far as there is ground of assurance that those conditions are realized.

Now, the observations concerning human affairs collected from common experience, are precisely of this nature. Even if they were universally and exactly true within the bounds of experience, which they never are, still they are not the ultimate laws of human action; they are not the principles of human nature, but results of those principles under the circumstances in

[a-a]MS, 43, 46 constitute
[b]MS, 43 various
[c-c]MS, 43, 46 depends

which mankind have happened to be placed. When the Psalmist [d]"said in his haste that all[d] men are liars,"[*] he enunciated what in some ages and countries is borne out by ample experience; but it is not a law of man's nature to lie; though it is one of the consequences of the laws of [e]human nature, that[e] lying is nearly universal when certain external circumstances exist universally, especially circumstances productive of habitual distrust and fear. When the character of the old is asserted to be cautious, and of the young impetuous, this, again, is but an empirical law; for it is not because of their youth that the young are impetuous, nor because of their age that the old are cautious. It is [f]chiefly, if not wholly,[f] because the old, during their many years of life, [g]have[g] generally had much experience of its various evils, and having suffered or seen others suffer much from incautious exposure to them, have acquired associations favourable to circumspection: while the young, as well from the absence of similar experience as from the greater strength of the inclinations which [h]urge them to enterprise, engage themselves in[h] it more readily. Here, then, is the *explanation* of the empirical law; here are the conditions which ultimately determine whether the law holds good or not. If an old man has not been oftener than most young men in contact with danger and difficulty, he will be equally incautious: if a youth has not stronger [i]inclinations[i] than an old man, he probably will be as little enterprising. The empirical law derives whatever truth it has, from the causal laws of which it is a consequence. If we know those laws, we know what are the limits to the derivative law: while, if we have not yet accounted for the empirical law—if it [j]rests[j] only on observation—there is no safety in applying it far beyond the limits of time, place, and circumstance, in which the observations were made.

The really scientific truths, then, are not these empirical laws, but the causal laws which explain them. The empirical laws of those phenomena which depend on known causes, and of which a general theory can therefore be constructed, have, whatever may be their value in practice, no other function in science than that of verifying the conclusions of theory. Still more must this be the case when most of the empirical laws amount, even within the limits of observation, only to approximate generalizations.

[*Psalms, 116:11.]

[d-d]MS, 43, 46, 51, 56, 62 "said in his wrath that all] 65 said in his wrath that "all] 68 said in his haste that "all
[e-e]MS, 43, 46 his nature, that the habit of
[f-f]+51, 56, 62, 65, 68, 72
[g-g]MS having [*printer's error?*]
[h-h]MS, 43, 46 tempt them into danger, expose themselves to
[i-i]MS, 43, 46 passions
[j-j]62, 65, 68 rest

§ 2. [*The Empirical Laws of Human Nature are merely approximate generalizations. The universal laws are those of the formation of character*] This however is not, so much as is sometimes supposed, a peculiarity of the sciences called moral. It is only in the simplest branches of science that empirical laws are ever exactly true; and not always in those. Astronomy, for example, is the simplest of all the sciences which explain, in the concrete, the actual course of natural events. The causes or forces, on which astronomical phenomena depend, are fewer in number than those which determine any other of the great phenomena of nature. Accordingly, as each effect results from the conflict of but few causes, a great degree of regularity and uniformity might be expected to exist among the effects; and such is really the case: they have a fixed order, and return in cycles. But propositions which should express, with absolute correctness, all the successive positions of a planet until the cycle is completed, would be of almost unmanageable complexity, and could be obtained from theory alone. The generalizations which can be collected on the subject from direct observation, even such as Kepler's law, are mere approximations: the planets, owing to their perturbations by one another, do not move in exact ellipses. Thus even in astronomy, perfect exactness in the mere empirical laws is not to be looked for; much less, then, in more complex subjects of inquiry.

The same example shows how little can be inferred against the universality or even the simplicity of the ultimate laws, from the impossibility of establishing any but [a]approximate[a] empirical laws of the effects. The laws of causation according to which a class of phenomena are produced may be very few and simple, and yet the effects themselves may be so various and complicated that it shall be impossible to trace any regularity whatever [b] completely through them. For the phenomena in question may be of an eminently modifiable character; insomuch that innumerable circumstances are capable of influencing the effect, although they may all do it according to a very small number of laws. Suppose that all which passes in the mind of man is determined by a few simple laws: still, if those laws be such that there is not one of the facts surrounding a human being, or of the events which happen to him, that does not influence in some mode or degree his subsequent mental history, and if the circumstances of different human beings are extremely different, it will be no wonder if very few propositions can be made respecting the details of their conduct or feelings, which will be true of all mankind.

Now, without deciding whether the ultimate laws of our mental nature are few or many, it is at least certain that they are of the above description. It is certain that our mental states, and our mental capacities and susceptibilities,

[a-a]MS, 43 approximative
[b]MS, 43, 46 , extending

are modified, either for a time or permanently, by everything which happens to us in life. Considering therefore how much these modifying causes differ in the case of any two individuals, it would be unreasonable to expect that the empirical laws of the human mind, the generalizations [c]which can be made[c] respecting the feelings or actions of mankind without reference to the causes that determine them, should be anything but approximate generalizations. They are the common wisdom of common life, and as such are invaluable; especially as they are mostly to be applied to cases not very dissimilar to those from which they were collected. But [d]when maxims of this sort, collected from Englishmen, come to be applied to Frenchmen, or when those[d] collected from the present day are applied to past or future generations, they are apt to be very much at fault. Unless we have resolved the empirical law into the laws of the causes on which it depends, and ascertained that those causes extend to the case which we have in view, there can be no reliance placed in our inferences. For every individual is surrounded by circumstances different from those of every other individual; every nation or generation of mankind from every other nation or generation: and none of these differences are without their influence in forming a different type of character. There is, indeed, also a certain general resemblance; but peculiarities of circumstances are continually constituting exceptions even to the propositions which are true in the great majority of cases.

Although, however, there is scarcely any mode of feeling or conduct which is, in the absolute sense, common to all mankind; and though the generalizations which assert that any given variety of conduct or feeling will be [e]found[e] universally, (however nearly they may approximate to truth within given limits of observation,) will be considered as scientific propositions by no one who is at all familiar with scientific investigation; yet all modes of feeling and conduct met with among mankind have causes which produce them; and in the propositions which assign those causes, will be found the explanation of the empirical laws, and the limiting principle of our reliance on them. [f]Human beings do not all feel and act alike in the same circumstances; but it is possible to determine what makes one person[f], in a given position, feel or act in one way, another in another; how any given mode of feeling and conduct, compatible with the general laws (physical and mental) of human nature, has been, or may be, formed. In other words, mankind have not one universal character, but there exist universal laws of the Formation of Character. And since it is by these laws, combined with the facts of each particular case, that the whole of the phenomena of human action and feeling are produced, it is on these that every rational attempt to construct the

[c-c]MS, 43, 46 we make
[d-d]MS, 43, 46 if maxims . . . or
[e-e]MS met with
[f-f]MS, 43 Men do . . . one man

science of human nature in the concrete, and for practical purposes, must proceed.

§ 3. [*The laws of the formation of character cannot be ascertained by observation and experiment*] The laws, then, of the formation of character being the principal object of scientific inquiry into human nature; it remains to determine the method of investigation best fitted for ascertaining them. And the logical principles according to which this question is to be decided, must be those which preside over [a]every[a] other attempt to investigate the laws of very complex phenomena. For it is evident that both the character of any human being, and the aggregate of the circumstances by which that character has been formed, are facts of a high order of complexity. Now to such cases we have seen that the Deductive Method, setting out from general laws, and verifying their consequences by specific experience, is alone applicable. The grounds of this great logical doctrine have formerly been stated: and its truth will derive additional support from a brief examination of the specialities of the present case.

There are [b] only two modes in which laws of nature can be ascertained: deductively, and experimentally: including under the denomination of experimental inquiry, observation as well as artificial experiment. Are the laws of the formation of character susceptible of a satisfactory investigation by the method of experimentation? Evidently not; because, even if we suppose unlimited power of varying the experiment, (which is abstractedly possible, though no one but an oriental despot [c]has that power, or if he had, would probably[c] be disposed to exercise it,) a still more essential condition is wanting; the power of performing any of the experiments with scientific accuracy.

The instances requisite for the prosecution of a directly experimental inquiry into the formation of character, would be a number of human beings to bring up and educate, from infancy to mature age. And to perform any one of these experiments with scientific propriety, it would be necessary to know and record every sensation or impression received by the young pupil from a period long before it could speak; including its own notions respecting the sources of all those sensations and impressions. It is not only impossible to do this completely, but even to do so much of it as should constitute a tolerable approximation. One apparently trivial circumstance which eluded our vigilance, might let in a train of impressions and associations sufficient to vitiate the experiment as an authentic exhibition of the effects flowing from given causes. No one who has sufficiently reflected on education is

[a-a]MS any
[b]MS , then,
[c-c]MS, 43, 46, 51, 56, 62, 65 either has . . . would

ignorant of this truth: and whoever has not, will find it most instructively illustrated in the writings of Rousseau and Helvetius on that great subject.

Under this impossibility of studying the laws of the formation of character by experiments purposely contrived to elucidate them, there remains the resource of simple observation. But if it be impossible to ascertain the influencing circumstances with any approach to completeness even when we have the shaping of them ourselves, much more impossible is it when the cases are further removed from our observation, and altogether out of our control. Consider the difficulty of the very first step—of ascertaining what actually is the character of the individual, in each particular case that we examine. There is hardly any person living, concerning some essential part of whose character there are not differences of opinion even among his intimate [d]acquaintances[d]: and a single action, or conduct continued only for a short time, goes a very little way [e] towards ascertaining it. We can only make our observations in a rough way, and *en masse*; not attempting to ascertain completely in any given instance, what character has been formed, and still less by what causes; but [f]only observing[f] in what state of previous circumstances it is found that certain marked mental qualities or deficiencies *oftenest* exist. These conclusions, besides [g]that they are[g] mere approximate generalizations, deserve no reliance, even as such, unless the instances are sufficiently numerous to eliminate not only chance, but every [h]assignable[h] circumstance in which a number of the cases examined may happen to have resembled one another. So numerous and various, [i]too[i], are the circumstances which form individual character, that the consequence of any particular combination is hardly ever some definite and strongly marked character, always found where that combination exists, and not otherwise. What is obtained, even after the most extensive and accurate observation, is merely a comparative result; as for example, that in a given number of Frenchmen, taken indiscriminately, there will be found more persons of a particular mental tendency, and fewer of the contrary tendency, than among an equal number of Italians or English, similarly taken; or thus: of a hundred Frenchmen and an equal number of Englishmen, fairly selected, and arranged according to the degree in which they possess a particular [j]mental characteristic, each number, 1, 2, 3, &c., of the one series, will be found to possess more of that characteristic than[j] the corresponding number of the other.

[d-d]MS, 43, 46, 51 acquaintance
[e]MS, 43, 46 indeed
[f-f]MS observing only
[g-g]MS being
[h-h]MS, 43, 46, 51, 56, 62, 65 accidental
[i-i]MS, 43, 46 moreover
[j-j]MS, 43, 46 quality, each . . . will surpass in that quality

Since, therefore, the comparison is not one of kinds, but of ratios and degrees; and since in proportion as the differences are slight, it requires a greater number of instances to eliminate chance; it cannot often happen to any one to know a sufficient number of cases with the accuracy requisite for making the sort of comparison last mentioned; less than which, however, would not constitute a real induction. Accordingly there is hardly one current opinion respecting the characters of nations, classes, or descriptions of persons, which is universally acknowledged as indisputable.*

And finally, if we could even obtain by way of experiment a much more satisfactory assurance of these generalizations than is really possible, they would still be only empirical laws. They would show, indeed, that there was some connexion between the type of character formed, and the circumstances existing in the case; but not what the precise connexion was, nor to which of the peculiarities of those circumstances the effect was really owing. They could only, therefore, be received as results of causation, requiring to be resolved into the general laws of the causes: until the determination of which, we could not judge within what limits the derivative laws might serve as presumptions in cases yet unknown, or even be depended on as permanent in the very cases from which they were collected. The French people had, or were supposed to have, a certain national character: but they drive out their royal family and aristocracy, alter their institutions, pass through a series of extraordinary events for [l]the greater part of[l] a century, and at the

*The most favourable cases for making such approximate generalizations are what may be termed collective instances; where we are fortunately enabled to see the whole class respecting which we are inquiring, in action at once; and, from the qualities displayed by the collective body, are able to judge what must be the qualities of the majority of the individuals composing it. Thus the character of a nation is shown in its acts as a nation; not so much in the acts of its government, for those are much influenced by other causes; but in the current popular maxims, and other marks of the general direction of public opinion; in the character of the [k]persons[k] or writings that are held in permanent esteem or admiration; in laws and institutions, so far as they are the work of the nation itself, or are acknowledged and supported by it; and so forth. But even here there is a large margin of doubt and uncertainty. These things are liable to be influenced by many circumstances: they are partly determined by the distinctive qualities of that nation or body of persons, but partly also by external causes which would influence any other body of persons in the same manner. In order, therefore, to make the experiment really complete, we ought to be able to try it without variation upon other nations: to try how Englishmen would act or feel if placed in the same circumstances in which we have supposed Frenchmen to be placed; to apply, in short, the Method of Difference as well as that of Agreement. Now these experiments we cannot try, nor even approximate to.

[k-k]MS, 43, 46 men
[l-l]MS, 43, 46, 51, 56, 62, 65, 68 half

end of that time [m]their character is found to have undergone important changes[m]. [n]A long list of mental and moral differences are observed, or supposed, to exist between men and women: but at some future, and, it may be hoped, not distant period, equal freedom and an equally independent social position come to be possessed by both, and their differences of character are either [o] removed or totally altered.[n]

But if the differences which [p]we think we[p] observe between French and English, or between [q]men and women[q], can be connected with more general laws; if they be such as [r]might be expected to be produced by the differences of government, former customs, and physical peculiarities in the two nations, and by[r] the [s]diversities of education, occupations, personal independence, and social privileges, and whatever original differences there may be in bodily strength and nervous sensibility between the two sexes[s]; [t] then, indeed, the coincidence of the two kinds of evidence justifies us in believing that we have both reasoned rightly and observed rightly. Our observation, though not sufficient as proof, is ample as verification. And having [u] ascertained not only the empirical laws, but the causes, of the peculiarities, we need be under no difficulty in judging how far they may be expected to be permanent, or by what circumstances they would be modified or destroyed.

§ 4. [*The laws of the formation of character must therefore be studied deductively*] Since, then, it is impossible to obtain really accurate propositions respecting the formation of character from observation and experiment

[m-m]MS, 43, 46, 51, 56 are found to be, in many respects, totally altered] 62, 65, 68 *as* MS . . . respects, greatly altered

[n-n]MS Women are observed to be different from men in a long series of qualities; but it becomes customary, perhaps, to give them an education more approximating to that of a man, and in the next generation the differences, though still real, are no longer the same.] 43, 46 The labouring classes are . . . *as* MS . . . from the higher in . . . *as* MS . . . that of their superiors in station, and in the next age the differences . . . *as* MS

[o]51, 56, 62, 65 entirely

[p-p]MS, 43 you think you

[q-q]43, 46 persons of station and persons of no station

[r-r]MS, 43, 46 would naturally flow from the differences . . . and from

[s-s]MS physiological differences and diversity of social position in the sexes] 43, 46 diversities of education, occupations, and social position in the different classes of society] 51, 56 *as* 72 . . . independence, social privileges, bodily strength, and nervous sensibility, in the two sexes

[t]51, 56 [*footnote:*] *Concerning the physical differences here spoken of, we ought not to omit to notice, that in placing them among the causes which produce differences in mental and moral character, it should by no means be supposed to be implied that they are ultimate causes. Those physical differences may be altogether the effects, as to a very great extent they can be proved to be, of a long course of external circumstances; and neither they, nor the mental and moral attributes which they tend to produce, may be more inevitable or indefeasible than any results of accident.

[u]MS now

alone, we are driven perforce to that which, even if it had not been the indispensable, would have been the most perfect, mode of investigation, and which it is one of the principal aims of philosophy to extend; namely, that which tries its experiments not on the complex facts, but on the simple ones of which they are compounded; and after ascertaining the laws of the causes, the composition of which gives rise to the complex phenomena, then considers whether these will not explain and account for the approximate generalizations which have been framed empirically respecting the sequences of [a]those[a] complex phenomena. The laws of the formation of character are, in short, derivative laws, resulting from the general laws of [b]mind; and[b] are to be obtained by deducing them from those general laws; by supposing any given set of circumstances, and [c]then[c] considering what, according to the laws of mind, will be the influence of those circumstances on the formation of character.

A science is thus formed, to which I would propose to give the name of Ethology, or the Science of Character; from ἦθος, a word more nearly corresponding to the term "character" as I here use it, than any other word in the same language. The name is perhaps etymologically applicable to the entire science of our mental and moral nature; but if, as is usual and convenient, we employ the name Psychology for the science of the elementary laws of mind, Ethology will serve for the [d]ulterior[d] science which determines the kind of character produced in conformity to those general laws, by any set of circumstances, physical and moral. According to this definition, Ethology is the science which corresponds to the art of education; in the widest sense of the term, including the formation of national [e]or collective[e] character as well as individual. [f]It would indeed[f] be vain to expect (however completely the laws of the formation of character might be ascertained) that we could know so accurately the circumstances of any given case as to be able positively to predict the character that would be produced in that case [g]. But we[g] must remember that a degree of knowledge far short of the power of actual prediction, is often of [h]much[h] practical value. There may be great power of influencing phenomena, with a very imperfect knowledge of the causes by which they are in any given instance determined. It is enough that we know that certain means have a *tendency* to produce a given effect, and that others have a tendency to frustrate it. When the circumstances of an individual or of a nation are in any considerable degree under our control, we may, by our knowledge of tendencies, be enabled to shape those circumstances in a manner much more favourable to the ends we desire, than the

[a-a]MS these [*printer's error?*]
[b-b]MS, 43, 46 the mind; and they
[c-c]+43, 46, 51, 56, 62, 65, 68, 72
[d-d]MS, 43, 46 subordinate
[e-e]+51, 56, 62, 65, 68, 72
[f-f]MS And though it would
[g-g]MS ; we
[h-h]MS, 43 great

shape which they would of themselves assume. This is the limit of our power; but within this limit the power is a most important one.

[i]This[i] science of Ethology may be called the Exact Science of Human Nature; for its truths are not, like the empirical laws which depend on them, approximate generalizations, but real laws. It is, however, (as in all cases of complex phenomena) necessary to the exactness of the propositions, that they should be hypothetical only, and affirm tendencies, not facts. They must not assert that something will always, or certainly, happen; but only that such and such will be the effect of a given cause, so far as it operates uncounteracted. It is a scientific proposition, that [j]bodily strength tends to make men courageous[j]; not that it always makes them so: that an interest on one side of a question tends to bias the judgment; not that it invariably does so: that experience tends to give wisdom; not that such is always its effect. These propositions, being assertive only of tendencies, are not the less universally true because the tendencies may be [k]frustrated[k].

§ 5. [*The principles of Ethology are the* axiomata media *of mental science*] While on the one hand Psychology is altogether, or principally, a science of observation and experiment, Ethology, as I have conceived it, is, as I have already remarked, altogether deductive. The one ascertains the simple laws of Mind in general, the other traces their operation in complex combinations of circumstances. Ethology stands to Psychology in a relation very similar to that in which the various branches of natural philosophy stand to mechanics. The principles of Ethology are properly the middle principles, the *axiomata media* (as Bacon would have said) of the science of mind: as distinguished, on the one hand from the empirical laws resulting from simple observation, and on the other from the highest generalizations.

And this seems a [a]suitable[a] place for a logical remark, which, though of general application, is of peculiar importance in reference to the present subject. Bacon has judiciously observed that the *axiomata media* of every science principally constitute its value.[*] The lowest generalizations, until explained by and resolved into the middle principles of which they are the consequences, have only the imperfect accuracy of empirical laws; while the most general laws are *too* general, and include too few circumstances, to give sufficient indication of what happens in individual cases, where the circumstances are almost always immensely numerous. In the importance, therefore, which Bacon assigns, in every science, to the middle principles, it

[*Novum Organum*, Bk. I, Aph. 104, p. 205.]

[i-i]MS, 43, 46, 51, 56, 62 The
[j-j]MS, 43, 46 cowardice tends to make men cruel
[k-k]MS, 43, 46 counteracted
[a-a]MS, 43, 46 very proper

is impossible not to agree with him. But I conceive him to have been radically wrong in his doctrine respecting the mode in which these *axiomata media* should be arrived at; though there is no one proposition laid down in his works for which he has been [b]more[b] extravagantly eulogized. He enunciates as an universal rule, that induction should proceed from the lowest to the middle principles, and from those to the highest, never reversing that order, and consequently, leaving no room for the discovery of new principles by way of deduction at all. It is not to be conceived that a man of [c]his[c] sagacity could have fallen into this mistake, if there had existed in his time, among the sciences which treat of successive phenomena, one single instance of a deductive science, such as mechanics, astronomy, optics, acoustics, &c. now are. In those sciences it is evident that the higher and middle principles are by no means derived from the lowest, but the reverse. In some of them the very highest generalizations were [d]those[d] earliest ascertained with any scientific exactness; as, for example (in mechanics), the laws of motion. Those general laws had not indeed at first the acknowledged universality which they acquired after having been successfully employed to explain many classes of phenomena to which they were not originally seen to be applicable; as when the laws of motion [e]were[e] employed, in conjunction with other laws, to explain deductively the celestial phenomena. Still, the fact remains, that the propositions which were afterwards recognised as the most general truths of the science, were, of all its accurate generalizations, those earliest arrived at. Bacon's greatest merit cannot therefore consist, as we are so often told that it did, in exploding the vicious method pursued by the ancients of flying to the highest generalizations first, and deducing the middle principles from them; since this is neither a vicious nor an exploded, but the universally accredited method of modern science, and that to which it owes its greatest triumphs. The error of ancient speculation did not consist in making the largest generalizations first, but in making them without the aid or warrant of rigorous inductive methods, and applying them deductively without the needful use of that important part of the Deductive Method termed Verification.

The order in which truths of the various degrees of generality should be ascertained, cannot, I apprehend, be prescribed by any unbending rule. I know of no maxim which can be laid down on the subject, but to obtain those first, in respect to which the conditions of a real induction can be first and most completely realized. Now, wherever our means of investigation can reach causes, without stopping at the empirical laws of the effects, the simplest cases, being those in which fewest causes are simultaneously concerned, will be most amenable to the inductive process; and these are the

[b-b]MS, 43, 46, 51, 56 so
[c-c]MS, 43 Bacon's
[d-d]MS the
[e-e]MS are [*printer's error?*]

cases which elicit laws of the greatest comprehensiveness. In every science, therefore, which has reached the stage at which it becomes a science of causes, it will be usual as well as desirable first to obtain the highest generalizations, and then deduce the more special ones from them. Nor can I discover any foundation for the Baconian maxim, so much extolled by subsequent writers, except this: That before we attempt to explain deductively from more general laws any new class of phenomena, it is desirable to have gone as far as is practicable in ascertaining the empirical laws of those phenomena; so as to compare the results of deduction, not with one individual instance after another, but with general propositions expressive of the points of agreement which have been found among [f]many[f] instances. For if Newton had been obliged to verify the theory of gravitation, not by deducing from it Kepler's laws, but by deducing all the observed planetary positions which had served Kepler to establish those laws, the Newtonian theory would probably never have emerged from the state of an hypothesis.*

The applicability of these remarks to the special case under consideration, cannot admit of question. The science of the formation of character is a science of causes. The subject is one to which those among the canons of induction, by which laws of causation are ascertained, can be rigorously applied. It is, therefore, both natural and advisable to ascertain the simplest, which are necessarily the most general, laws of causation first, and to deduce the middle principles from them. In other words, Ethology, the deductive science, is a system of corollaries from Psychology, the experimental science.

§ 6. [*Ethology characterized*] Of these, the earlier alone has been, as yet, really conceived or studied as a science; the other, Ethology, is still to be

*[51] "To which," says Dr. Whewell, "we may add, that it is certain from the history of the subject, that in that case the hypothesis would never have been framed at all." [*Philosophy of Discovery*, p. 282.]

Dr. Whewell (*ibid.*, pp. 277–82) defends Bacon's rule against the preceding strictures. But his defence consists only in asserting and exemplifying a proposition which I had myself stated, viz. that though the largest generalizations may be the earliest made, they are not at first seen in their entire generality, but acquire it by degrees, as they are found to explain one class after another of phenomena. The laws of motion, for example, were not known to extend to the celestial regions, until the motions of the celestial bodies had been deduced from them. This however does not in any way affect the fact, that the middle principles of astronomy, the central force for example, and the law of the inverse square, could not have been discovered, if the laws of motion, which are so much more universal, had not been known first. On Bacon's system of step-by-step generalization, it would be impossible in any science to ascend higher than the empirical laws; a remark which Dr. Whewell's own Inductive Tables [see *Novum Organon Renovatum*, p. 140], referred to by him in support of his argument, amply bear out.

[f-f]MS all the

created. But [a]its creation has at length become practicable[a]. The empirical laws, destined to verify its deductions, have been [b]formed[b] in abundance by every successive age of humanity; and the premises for the deductions are now sufficiently complete. Excepting the degree of uncertainty which still exists as to the extent of the natural differences of [c]individual[c] minds, and the physical circumstances on which these may be dependent, (considerations which are of secondary importance when we are considering mankind in the average, or *en masse*,) I believe most competent judges will agree that the general laws of the different constituent elements of human nature are [d]even[d] now sufficiently understood, to render it possible for a competent thinker to deduce from those laws [e]with a considerable approach to certainty,[e] the particular type of character which would be formed, in mankind generally, by any assumed set of circumstances. A science of Ethology, founded on the laws of Psychology, is therefore possible; though little has yet been done, and that little not at all systematically, towards forming it. The progress of this important but most imperfect science will depend on a double process: first, that of deducing theoretically the ethological consequences of particular circumstances of position, and comparing them with the recognised results of common experience; and secondly, the reverse operation; increased study of the various types of human nature that are to be found in the world; conducted by persons not only capable of analysing and recording the circumstances in which these types severally prevail, but also sufficiently acquainted with psychological laws, to be able to explain and account for the characteristics of the type, by the peculiarities of the circumstances: the residuum [f]alone, when there proves to be[f] any, being set down to the account of congenital predispositions.

[g]For the[g] experimental or *à posteriori* part of this process [h], the materials are continually accumulating by the observation of mankind. So far as thought is concerned, the great problem of[h] Ethology is to deduce the requisite middle principles from the general laws of Psychology. The subject to be studied is, the [i]origin and sources[i] of all those qualities in human beings which are [j] interesting to us, either as facts to be produced, to be avoided, or

[a-a]MS, 43, 46 all things are prepared for its creation
[b-b]MS, 43, 46 afforded
[c-c]MS, 43, 46 human
[d-d]+51, 56, 62, 65, 68, 72
[e-e]+68, 72
[f-f]MS, 43, 46, 51, 56 if
[g-g]MS, 43, 46 The
[h-h]MS is carried on in our own day with much greater ardour than heretofore. The great step, therefore, which remains to be taken in] 43, 46 *as* MS . . . greater activity than . . . *as* MS
[i-i]MS generation
[j]MS, 43, 46 most

merely to be understood: and the object is, to determine, from the general laws of mind, combined with the general position of our species in the universe, what actual or possible combinations of circumstances are capable of promoting or of preventing the production of those qualities. A science which possesses middle principles of this kind, arranged in the order, not of causes, but of the effects which it is desirable to produce or to prevent, is duly prepared to be the foundation of the corresponding Art. And when Ethology shall be thus prepared, practical education will be the mere transformation of those principles into a parallel system of precepts, and the adaptation of these to the sum total of the individual circumstances which exist in each particular case.

It is hardly necessary again to repeat, that, as in every other deductive science, [k]verification *à posteriori* must proceed *pari passu* with[k] deduction *à priori*. The inference given by theory as to the type of character which would be formed by any given circumstances, must be tested by specific experience of those circumstances whenever obtainable; and the [l]conclusions of the science as a whole,[l] must undergo a perpetual verification and correction from the general remarks afforded by common experience respecting human nature in our own age, and by history respecting times gone by. The conclusions of theory cannot be trusted, unless confirmed by observation; nor those of observation, unless they can be affiliated to [m] theory, by deducing them from the laws of human nature, and from a close analysis of the circumstances of the particular situation. It is the accordance of these two kinds of evidence separately taken—the [n]consilience[n] of *à priori* reasoning and specific experience—which forms the only sufficient ground for the principles of any science so "immersed in matter," dealing with [o]such complex and[o] concrete phenomena, as Ethology.

[k-k]MS, 43, 46 the work of verification . . . with that of
[l-l]MS, 43, 46 whole conclusions of the science
[m]MS, 43, 46, 51, 56, 62, 65 the
[n-n]MS, 43, 46 *consilience* (as Mr. Whewell would express it) [*Novum Organon Renovatum*, p. 101]
[o-o]MS, 43, 46 so complex and so

CHAPTER VI

General Considerations on the Social Science

§ 1. [*Are Social Phenomena a subject of Science?*] Next after the science of individual man, comes the science of man in society: of the actions of collective masses of mankind, and the various phenomena which constitute social life.

If the formation of individual character is already a complex subject of study, this subject [a]must be, in appearance at least, still[a] more complex; because the number of concurrent causes, all exercising more or less influence on the total effect, is greater, in the proportion in which a nation, or the species at large, exposes a larger surface to the operation of agents, psychological and physical, than any single individual. If it was necessary to prove, in opposition to an existing prejudice, that the simpler of the two is capable of being a subject of science; the prejudice is likely to be yet stronger against the possibility of giving a scientific character to the study of Politics, and of the phenomena of Society. It is, accordingly, but of yesterday that the conception of a political or social science has existed, anywhere but in the mind of here and there an insulated thinker, generally very ill prepared for its realization: though the subject itself has of all others engaged the most general attention, and been a theme of interested and earnest discussions, almost from the beginning of recorded time.

The condition indeed of politics, as a branch of knowledge, was until very lately, and has scarcely even yet ceased to be, that which Bacon animadverted on, as the natural state of the sciences while their cultivation is abandoned to practitioners; not being carried on as a branch of speculative inquiry, but only with a view to the exigencies of daily practice, and the *fructifera experimenta*, therefore, being aimed at, almost to the exclusion of the *lucifera*.[*] Such was medical [b]investigation[b], before physiology and natural history began to be cultivated as branches of general knowledge. The only questions

[*See *Novum Organum*, Bk. I, Aph. 99, p. 203.]

[a-a]MS, 43, 46 , it is evident, must be greatly
[b-b]MS, 43, 46 science

examined were, what diet is wholesome, or what medicine will cure some given disease; without any previous systematic inquiry into the laws of nutrition, and of the healthy and morbid action of the different organs, on which laws the effect of any diet or medicine must evidently depend. And in politics, the questions which engaged general attention were similar:—Is such an enactment, or such a form of government, beneficial or the reverse—either universally, or to some particular community? without [c]any previous[c] inquiry into the general conditions by which the operation of legislative measures, or the effects produced by forms of government, are determined. [d] Students in politics thus attempted to study the pathology and therapeutics of the social body, before they had laid the necessary foundation in its physiology; to cure disease without understanding the laws of health. And the result was such as it must always be when [e]persons, even of ability,[e] attempt to deal with the complex questions of a science before its simpler and more elementary [f]truths[f] have been established.

No wonder that when the phenomena of society have so rarely been contemplated in the point of view characteristic of science, the philosophy of society should have made little progress; should contain few general propositions sufficiently precise and certain, for common inquirers to recognise in them a scientific character. The vulgar notion accordingly is, that all pretension to lay down general truths on politics and society is quackery; that no universality and no certainty are attainable in such matters. What partly excuses this common notion is, that it is really not without foundation in one particular sense. A large proportion of those who have laid claim to [g]the character of[g] philosophic politicians, have attempted, not to ascertain universal sequences, but to frame universal precepts. They have [h]imagined[h] some one form of government, or system of laws, to fit all cases; a pretension

[c-c]+65, 68, 72

[d]MS, 43, 46 [*paragraph*] And even among the few who did carry their speculations to that greater length, it is only at a still more recent date that social phenomena, properly so called, have begun to be looked upon as having any natural tendencies of their own. It is hardly an exaggeration to say that society has usually, both by practitioners in politics and by philosophical speculators on forms of government, from Plato to Bentham, been deemed to be whatever the men who compose it choose to make it. The only questions which people thought of proposing to themselves were, Would such and such a law or institution be beneficial? and, if so, can legislators or the public be persuaded, or otherwise induced, to adopt it? For hardly any notion was entertained that there were limits to the power of human will over the phenomena of society, or that any social arrangements which would be desirable, could be impracticable from incompatibility with the properties of the subject matter: the only obstacle was supposed to lie in the private interests or prejudices, which hindered men from being willing to see them tried.

[e-e]MS, 43, 46 men even of great ability

[f-f]MS, 43, 46, 51, 56, 62, 65 propositions

[g-g]MS being

[h-h]MS, 43, 46, 51, 56 had

well meriting the ridicule with which it is treated by practitioners, and wholly unsupported by the analogy of the art to which, from the nature of its subject, that of politics must be the [i]most nearly[i] allied. No one now supposes it possible that one remedy can cure all diseases, or even the same disease in all constitutions and habits of body. [j]

It is not necessary [k]even to[k] the perfection of a science, that the corresponding art should possess universal, or even general, rules. The phenomena of society might not only be [l]completely dependent on known[l] causes, but the mode of action of all those causes might be reducible to laws of considerable simplicity, and yet no two cases might admit of being treated in precisely the same manner. So great might be the variety of circumstances on which the results in different cases depend, that [m]the[m] art might not have a single general precept to give, except that of watching the circumstances of the [n]particular[n] case, and adapting our measures to the effects which, according to the principles of the science, result from those circumstances. But [o]although[o], in so complicated a class of subjects, it is [p]impossible[p] to lay down practical maxims of universal application, it does not follow that the phenomena do not conform to universal laws.

§ 2. [*Of what nature the Social Science must be*] All phenomena of society are phenomena of human nature, generated by the action of outward circumstances upon [a]masses of human beings[a]: and if, therefore, the phenomena of human thought, feeling, and action, are subject to fixed laws, the phenomena of society cannot but conform to fixed laws, the [b]consequence[b] of the preceding. There is, indeed, no hope that these laws, though our knowledge of them were as certain and as complete as it is in astronomy, would enable us to predict the history of society, like that of the celestial appearances, for thousands of years to come. But the difference of certainty is not in the laws themselves, it is in the data to which [c]these[c] laws are to be applied. In astronomy the causes influencing the result are few, and change little, and that little according to known laws; we can ascertain what they are now, and thence determine what they will be at any epoch of a distant future.

[i-i]MS nearest
[j]MS, 43, 46 Yet physiology is admitted to be a science, and medical practice, when it disregards the indications of the science, to be criminal quackery.
[k-k]MS, 43 to even
[l-l]MS in the most complete dependence upon
[m-m]+46, 51, 56, 62, 65, 68, 72
[n-n]+51, 56, 62, 65, 68, 72
[o-o]MS, 43, 46, 51, 56 because
[p-p]MS, 43 absurd
[a-a]MS the collective mind of our race
[b-b]MS, 43, 46 consequences
[c-c]MS those [*printer's error?*]

The data, therefore, in astronomy, are as certain as the laws themselves. The circumstances, on the contrary, which influence the condition and progress of society, are innumerable, and perpetually changing; and though they all change in obedience to causes, and therefore to laws, the multitude of the causes is so great as to defy our limited powers of calculation. Not to say that the impossibility of applying precise numbers to facts of such a description, would set an impassable limit to the possibility of calculating them beforehand, even if the powers of the human intellect were otherwise adequate to the task.

But, as [d] before remarked, an amount of knowledge quite insufficient for prediction, may be most valuable for guidance. The science of society would have attained a very high point of perfection, if it enabled us, in any given condition of social affairs, in the condition for instance of Europe or any European country at the present time, to understand by what causes it had, in any and every particular, been made what it was; whether it was tending to any, and to what, changes; what effects each feature of its existing state was likely to produce in the future; and by what means any of those effects might be prevented, modified, or accelerated, or a different class of effects superinduced. There is nothing chimerical in the hope that general laws, sufficient to enable us to answer these various questions for any country or time with the individual circumstances of which we are well acquainted, do really admit of being ascertained; and [e] that the other branches of human knowledge, which this undertaking presupposes, are so far advanced that the time is ripe for its [f]commencement[f]. Such is the object of the Social Science.

That the nature of what I consider the true method of the science may be made more palpable, by first showing what that method is not; it will be expedient to characterize briefly two radical misconceptions of the proper mode of philosophizing on society and government, one or other of which is, either explicitly or more often unconsciously, entertained by almost all who have meditated or argued respecting the logic of politics since the notion of treating it by strict rules, and on Baconian principles, has been current among the more advanced thinkers. These erroneous methods, if the word method can be applied to erroneous tendencies arising from the absence of any sufficiently distinct conception of method, may be [g] termed the Experimental, or Chemical, mode of investigation, and the Abstract, or Geometrical, mode. We shall begin with the former.

[d]MS, 43 we
[e]MS, 43, 46 moreover,
[f-f]MS, 43, 46 accomplishment
[g]MS, 43, 46 aptly

CHAPTER VII

Of the Chemical, or Experimental, Method in the Social Science

§ 1. [*Characters of the mode of thinking which deduces political doctrines from specific experience*] The laws of the phenomena of society are, and can be, nothing but the laws of the actions and passions of human beings united together in the social state. Men, however, in a state of society, are still men; their actions and passions are obedient to the laws of individual human nature. Men are not, when brought together, converted into another kind of substance, with different properties; as hydrogen and oxygen are different from water, or as hydrogen, oxygen, carbon, and azote, are different from nerves, muscles, and tendons. Human beings in society have no properties but those which are derived from, and may be resolved into, the laws of the nature of individual man. In social phenomena the Composition of Causes is the universal law.

Now, the method of philosophizing which may be termed chemical overlooks this fact, and proceeds as if the nature of man as an individual were not concerned at all, or [a]were[a] concerned in a very inferior degree, in the operations of [b]human beings[b] in society. All reasoning in [c]political[c] or social affairs, grounded on principles of human nature, is objected to by reasoners of this sort, under such names as "abstract theory." For [d]the direction of[d] their opinions and conduct, they profess to demand, in all cases without exception, specific experience.

This mode of thinking is not only general with practitioners in politics, and with that very numerous class who (on a subject which no one, however ignorant, thinks himself incompetent to discuss) profess to guide themselves by common sense rather than by science; but is often countenanced by persons with greater pretensions to instruction; persons who, having sufficient acquaintance with books and with the current ideas to have heard that Bacon taught [e]mankind[e] to follow experience, and to ground their conclusions on facts instead of metaphysical dogmas—think that, by treating political facts

[a-a]+68, 72
[b-b]MS, 43, 46 man
[c-c]MS, 43, 46, 51, 56 politics
[d-d]MS, 43, 46 governing
[e-e]MS, 43, 46 men

in as directly experimental a method as chemical facts, they are showing themselves true Baconians, and proving their adversaries to be mere syllogizers and schoolmen. As, however, the notion of the applicability of experimental methods to political philosophy cannot coexist with any just conception of [f]these[f] methods themselves, the kind of arguments from experience which the chemical theory brings forth as its fruits (and which form the staple, in this country especially, of parliamentary and hustings oratory,) are such as, at no time since Bacon, would have been admitted to be valid in chemistry itself, or in any other branch of experimental science. They are such as these; that the prohibition of foreign commodities must conduce to national wealth, because England has flourished under it, or because countries in general which have adopted it have flourished; that our laws, or our internal administration, or our constitution, are excellent for a similar reason: and the eternal arguments from historical examples, from Athens or Rome, from the fires in Smithfield or the French Revolution.

I will not waste time in contending against modes of argumentation which no person, with the smallest practice in estimating evidence, could possibly be betrayed into; which draw conclusions of general application from a single unanalysed instance, or arbitrarily refer an effect to some one among its antecedents, without any process of elimination or comparison of instances. It is a rule both of justice and of good sense to grapple not with the absurdest, but with the most reasonable form of a wrong opinion. We shall suppose our inquirer acquainted with the true conditions of experimental investigation, and competent in point of [g]acquirements[g] for realizing them, [h]so far as they can be realized[h]. He shall know as much of the facts of history as mere erudition can teach—as much as can be proved by testimony, without the assistance of any theory; and if those mere facts, properly collated, can fulfil the conditions of a real induction, he shall be qualified for the task.

But, that no such attempt can have the smallest chance of success, has been abundantly shown in the tenth chapter of the Third Book.* We there examined whether effects which depend on a complication of causes can be made the [i]subject[i] of a true induction by observation and experiment; and concluded, on the most convincing grounds, that they cannot. Since, of all effects, none depend on so great a complication of causes as social phenomena, we might leave our case to rest in safety on that previous showing. But a logical principle as yet so little familiar to the ordinary run of thinkers,

*P. 442 to the end of the chapter.

[f-f]MS those [*printer's error?*]
[g-g]MS acquirement [*printer's error?*]
[h-h]MS, 43, 46 if they can be realized in any case of the kind
[i-i]MS, 43, 46 subjects

requires to be insisted on more than once, in order to make the due impression; and the present being the case which of all others exemplifies it the most strongly, there will be advantage in re-stating the grounds of the general maxim, as applied to the specialities of the class of inquiries now under consideration.

§ 2. [*In the Social Science experiments are impossible*] The first difficulty which meets us in the attempt to apply experimental methods for ascertaining the laws of social phenomena, is that we are without the means of making artificial experiments. Even if we could contrive experiments at leisure, and try them without limit, we should do so under immense [a]disadvantage[a]; both from the impossibility of ascertaining and taking note of all the facts of each case, and because (those facts being in a perpetual state of change) before sufficient time had elapsed to ascertain the result of the experiment, some material circumstances would always have ceased to be the same. But it is unnecessary to consider the logical objections which would exist to the conclusiveness of our experiments, since we palpably never have the power of trying any. We can only watch those which nature produces, or [b] which are produced for other reasons. We cannot adapt our logical means to our wants, by varying the circumstances as the exigencies of elimination may require. If the spontaneous instances, formed by [c]cotemporary[c] events and by the successions of phenomena recorded in history, afford a sufficient variation of circumstances, an induction from specific experience is attainable; otherwise not. The question to be resolved is, therefore, whether the requisites for induction respecting the causes of political effects or the properties of political agents, are to be met with in history? including under the term, [d]cotemporary[d] history. And in order to give fixity to our conceptions, it will be advisable to suppose this question asked in reference to some special subject of political inquiry or controversy; such as that [e]frequent[e] topic of debate in the present [f]century[f], the operation of restrictive and prohibitory commercial legislation upon national wealth. Let this, then, be the scientific question to be investigated by specific experience.

§ 3. [*The Method of Difference inapplicable in the Social Science*] In order to apply to the case the most perfect of the methods of experimental inquiry, the Method of Difference, we require to find two instances, which tally in every particular except the one which is the subject of inquiry. If two nations can be found which are alike in all natural advantages and dis-

[a–a]MS, 43, 46 disadvantages
[b]MS, 43, 46 those
[c–c]MS, 43, 46 contemporary
[d–d]MS, 43, 46 contemporary
[e–e]MS, 43, 46 great
[f–f]MS, 43, 46, 51, 56 day

advantages; whose people resemble each other in every quality, physical and moral, [a]spontaneous[a] and acquired; whose habits, usages, opinions, laws and institutions are the same in all respects, except that one of them has a more protective tariff, or in other respects interferes more with the freedom of industry; [b] if one of these nations is found to be rich, and the other poor, or one richer than the other, this will be an *experimentum crucis*: a real proof by experience, which of the two systems is most favourable to national riches. But the supposition that two such instances can be met with is [c]manifestly absurd[c]. Nor is such a concurrence even abstractedly possible. Two nations which agreed in everything except their commercial policy, would agree also in that. Differences of legislation are not inherent and ultimate diversities; are not properties of Kinds. They are effects of pre-existing causes. If the two nations differ in this portion of their institutions, it is from some difference in their position, and thence in their apparent interests, or in some portion or other of their opinions, habits, and tendencies; which opens a view of further differences without any assignable limit, capable of operating on their industrial prosperity, as well as on every other feature of their condition, in more ways than can be enumerated or imagined. There is thus a demonstrated impossibility of obtaining, in the investigations of the social science, the conditions required for the most conclusive form of inquiry by specific experience.

In the absence of the direct, we may next try, as in other cases, the supplementary resource, called in a former place the Indirect Method of Difference: which, instead of two instances differing in nothing but the presence or absence of a given circumstance, compares two *classes* of instances respectively agreeing in nothing but the presence of a circumstance on the one side and its absence on the other. To choose the most advantageous case conceivable, (a case far too advantageous to be ever obtained,) suppose that we compare one nation which has a restrictive policy, with two or more nations agreeing in nothing but in permitting free trade. We need not now suppose that either of these nations agrees with the first in all its circumstances; one may agree with it in some of its circumstances, and another in the remainder. And it may be argued, that if these nations remain poorer than the restrictive nation, it cannot be for want either of the first or of the second set of circumstances, but it must be for want of the [d]protective[d] system. If (we might say) the restrictive nation had prospered from the one set of causes, the first of the free-trade nations would have prospered equally; if by reason of the other, the second would: but neither has: therefore the prosperity was owing to the restrictions. This will be allowed to be a very favourable specimen of an argument from specific experience in politics,

[a-a]MS, 43, 46 innate
[b]MS, 43, 46 and
[c-c]MS, 43, 46 absurd on the face of it
[d-d]MS, 43, 46 protecting

and if this be inconclusive, it would not be easy to find another preferable to it.

Yet, that it is inconclusive, scarcely requires to be pointed out. Why must the prosperous nation have prospered from one cause exclusively? National prosperity is always the collective result of a multitude of favourable circumstances; and of these, the restrictive nation may unite a greater number than either of the others, though it may have all of those circumstances in common with either one or the other of them. Its prosperity may be partly owing to circumstances common to it with one of those nations, and partly with the other, while they, having each of them only half the number of favourable circumstances, have remained inferior. So that the closest imitation which can be made, in the social science, of a [e]legitimate[e] induction from direct experience, gives but a specious semblance of conclusiveness, without any real value.

§ 4. [*The Methods of Agreement, and of Concomitant Variations, inconclusive in the Social Science*] The Method of Difference in either of its forms being thus completely out of the question, there remains the Method of Agreement. But we are already aware of how little value this method is, in cases admitting Plurality of Causes: and social phenomena are those in which the plurality prevails in the utmost possible extent.

Suppose that the observer makes the luckiest hit which could be given [a] by any conceivable combination of chances: that he finds two nations which agree in no circumstance whatever, except in having a restrictive system, and in being prosperous; or a number of nations, all prosperous, which have no antecedent circumstances common to them all but that of having a restrictive policy. It is unnecessary to go into the consideration of the impossibility of ascertaining from history, or even from [b]cotemporary[b] observation, that such is really the fact: that the nations agree in no other circumstance capable of influencing the case. Let us suppose this impossibility vanquished, and the fact ascertained that they [c]agree[c] only in a restrictive system as an antecedent, and industrial prosperity as a consequent. What degree of presumption does this raise, that the restrictive system caused the prosperity? One so trifling as to be equivalent to none at all. That some one antecedent is the cause of a given effect, because all other antecedents have been found capable of being eliminated, is a just inference, only if the effect can have but one cause. If it admits of several, nothing is more natural than that each of these should separately admit of being eliminated. Now, in the case of political phenomena, the supposition of unity of cause is not only wide of the truth, but at

[e-e]MS, 43, 46 genuine
[a]MS, 43, 46 him
[b-b]MS, 43, 46 contemporary
[c-c]MS, 43, 46, 51 agreed

an immeasurable distance from it. The causes of every social phenomenon which we are particularly interested about, security, wealth, freedom, good government, public virtue, [d]general[d] intelligence, or their opposites, are infinitely numerous, especially the external or remote causes, which alone are, for the most part, accessible to direct observation. No one cause suffices of itself to produce any [e] of these phenomena; while there are countless causes which have some influence over them, and may co-operate either in their production or in their prevention. From the mere fact, therefore, of our having been able to eliminate some circumstance, we can by no means infer that this circumstance was not instrumental to the effect [f]in some of[f] the very instances from which we have eliminated it. We [g]can[g] conclude that the effect is sometimes produced without it; but not that, when present, it does not contribute its [h]share[h].

Similar objections will be found to apply to the Method of Concomitant Variations. If the causes which act upon the state of any society produced effects differing from one another in kind; if wealth depended on one cause, peace on another, a third made [i] people virtuous, a fourth intelligent; we might, though unable to sever the causes from one another, refer to each of them that property of the effect which waxed as it waxed, and which waned as it waned. But every attribute of the social body is influenced by innumerable causes; and such is the mutual action of the coexisting elements of society, that whatever affects any one of the more important of them, will by that alone, if it does not affect the others directly, affect them indirectly. The effects, therefore, of different agents not being different in quality, while the quantity of each is the mixed result of all the agents, the variations of the aggregate cannot bear [j]an[j] uniform proportion to those of any one of its component parts.

§ 5. [*The Method of Residues [a]also inconclusive in the Social Science, and[a] presupposes Deduction*] There remains the Method of Residues; which appears, on the first view, less foreign to this kind of inquiry than the three other methods, because it only requires that we should accurately note the circumstances of some one country, or state of society. Making allowance, thereupon, for the effect of all causes whose tendencies are known, the residue which those causes are inadequate to explain may plausibly be imputed to the remainder of the circumstances which are known to have

[d-d]MS, 43, 46, 51, 56, 62, 65 public
[e]MS, 43, 46, 51, 56 one
[f-f]MS, 43, 46, 51 even in
[g-g]MS, 43, 46 may
[h-h]MS, 43, 46, 51, 56 part
[i]MS, 43, 46 a
[j-j]43, 46 any
[a-a]+51, 56, 62, 65, 68, 72

existed in the case. Something similar to this is the method which Coleridge* describes himself as having followed in his political essays in the *Morning Post*. "On every great occurrence I endeavoured to discover in past history the event that most nearly resembled it. I procured, [b]whenever[b] it was possible, the contemporary historians, memorialists, and pamphleteers. Then fairly subtracting the points of difference from those of likeness, as the balance favoured the former or the latter, I conjectured that the result would be the same or different." As, for instance, "in the series of essays entitled 'A comparison of France under Napoleon with Rome under the first Cæsars,' and in those which followed, 'on the probable final restoration of the Bourbons.' . . . The same plan I pursued at the commencement of the Spanish Revolution, and with the same success, taking the war of the United Provinces with Philip II as the groundwork of the comparison." In [c]this inquiry he[c] no doubt employed the Method of Residues; for, in "subtracting the points of difference from those of likeness," he doubtless weighed, and did not content himself with numbering, them: he doubtless took those points of agreement only, which [d]he presumed[d] from their own nature to be capable of influencing the effect, and, allowing for that influence, concluded that the remainder of the result would be referable to the points of difference.

Whatever may be the efficacy of this method, it is, as we long ago remarked, not a method of pure observation and experiment; it concludes, not from a comparison of instances, but from the comparison of an instance with the result of a previous deduction. Applied to social phenomena, it presupposes that the causes from which part of the effect proceeded are already known; and as we have shown that these cannot have been known by specific experience, they must have been learnt by deduction from [e] principles of human nature; experience being called in only as a supplementary resource, to determine the causes which produced an unexplained residue. But if the principles of human nature may be had recourse to for the establishment of some political truths, they may for all. If it be admissible to say, England must have prospered by reason of [f]the[f] prohibitory system, because after allowing for all the other tendencies which have been operating, there is a portion of prosperity still to be accounted for; it must be admissible to go to the same source for the effect of the prohibitory system, and examine what account the laws of human motives and actions will enable us to give of *its* tendencies. Nor, in fact, will the experimental argument amount to anything,

**Biographia Literaria*, Vol. I, pp. 214–15.

[b-b]Source, MS, 43, 46 wherever
[c-c]MS thus arguing, Coleridge,] 43 this inquiry Coleridge [*printer's error?*]
[d-d]MS, 43, 46 might be known [e]MS, 43, 46 the
[f-f]MS, 43, 46 her

except [g]in[g] verification of a conclusion drawn from those general laws. For we may subtract the effect of one, two, three, or four causes, but we shall never succeed in subtracting the effect of all causes except one: while it would be a curious instance of the dangers of too much caution, if, to avoid depending on *à priori* reasoning concerning the effect of a single cause, we should oblige ourselves to depend on as many separate *à priori* reasonings as there are causes operating concurrently with that particular cause in some given instance.

We have now sufficiently characterized the [h]gross[h] misconception of the mode of investigation proper to political phenomena, which I have termed the Chemical Method. So lengthened a discussion would not have been necessary, if the claim to decide authoritatively on political doctrines were confined to persons who had competently studied any one of the higher departments of physical science. But since the generality of those who reason on political subjects, satisfactorily to themselves and to a more or less numerous body of admirers, know nothing whatever of the methods of physical investigation beyond a few precepts which they continue to parrot after Bacon, being entirely unaware that Bacon's conception of scientific inquiry has done its work, and that science has now advanced into a higher stage; there are probably many to whom such remarks as the foregoing may still be useful. In an age in which chemistry itself, when attempting to deal with the more complex chemical sequences, those of the animal or even the vegetable organism, has found it necessary to become, and has succeeded in becoming, a Deductive Science—it is not to be apprehended that any person of scientific habits, who has kept pace with the general progress of the knowledge of nature, can be in danger of applying the methods of elementary chemistry to explore the sequences of the most complex order of phenomena in existence.

[g-g]MS as a
[h-h]MS, 43, 46, 51, 56 absurd

CHAPTER VIII

Of the Geometrical, or Abstract Method

§ 1. [*Characters of this mode of thinking*] The misconception discussed in the preceding chapter is, as we said, chiefly committed by persons not much accustomed to scientific investigation: practitioners in politics, who rather employ the commonplaces of philosophy to justify their practice, than seek to guide their practice by [a]philosophic principles[a]: or imperfectly educated [b]persons[b], who, in ignorance of the careful selection and elaborate comparison of instances required for the formation of a sound theory, attempt to found one upon a few coincidences which they have casually noticed.

The erroneous method of which we are now to treat, is, on the contrary, peculiar to thinking and studious minds. It never could have suggested itself but to persons of some familiarity with the nature of scientific research; who,—being aware of the impossibility of establishing, by casual observation or direct experimentation, a true theory of sequences so complex as are those of the social phenomena,—have recourse to the simpler laws which are immediately operative in those phenomena, and which are no other than the laws of the nature of the human beings therein concerned. These thinkers perceive (what the partisans of the chemical or experimental theory do not) that the [c]science of society must necessarily be deductive[c]. But, from an insufficient consideration of the specific nature of the subject matter,—and often because (their own scientific education having stopped short in too early a stage) geometry stands in their minds as the type of all deductive science,—it is to geometry, rather than to astronomy and natural philosophy, that they unconsciously assimilate the deductive science of society.

Among the differences between geometry (a science of coexistent facts, altogether independent of the laws of the succession of phenomena), and those physical Sciences of Causation which have been rendered deductive, the following is one of the most conspicuous: That geometry affords no room

[a-a]MS, 43, 46 any philosophic views
[b-b]MS, 43, 46 men
[c-c]MS, 43, 46 philosophy of society is a deductive science

for what so constantly occurs in mechanics and its applications, the case of conflicting forces; of causes which counteract or modify one another. In mechanics we continually find two or more moving forces producing, not motion, but rest; or motion in a different direction from that which would have been produced by either of the generating forces. It is true that the effect of the joint forces is the same when they act simultaneously, as if they had acted one after another, or by turns; and it is in this that the difference between mechanical and chemical laws consists. But still the effects, whether produced by successive or by simultaneous action, do, wholly or in part, cancel one another: what the one force does, the other, partly or altogether, undoes. There is no similar state of things in geometry. The result which follows from one geometrical principle has nothing that [d]conflicts with[d] the result which follows from another. What is proved true from one geometrical theorem, what would be true if no other geometrical principles existed, cannot be altered and made no longer true by reason of some other [e]geometrical[e] principle. What is once proved true [f]is[f] true in all cases, whatever supposition may be made in regard to any other matter.

Now a conception, similar to this last, would appear to have been formed of the social science, in the minds of the earlier of those who have attempted to cultivate it by a deductive method. Mechanics would be a science very similar to geometry, if every motion resulted from one force alone, and not from a conflict of forces. In the geometrical theory of society, it seems to be supposed that this is really the case with the social phenomena; [g] that each of them results always from only one force, one single property of human nature.

At the point which we have now reached, it cannot be necessary to say anything either in proof or in illustration of the assertion that such is not the true character of the social phenomena. There is not, among [h]these[h] most complex and (for that reason) most modifiable of all phenomena, any one over which innumerable forces do not exercise influence; which does not depend on a conjunction of very many causes. We have not, therefore, to prove the notion in question to be an error, but to prove that the error has been committed; that so mistaken a conception of the mode in which the phenomena of society are produced, has actually been [i]ascertained[i].

§ 2. [*Examples of the Geometrical Method*] One numerous division of the reasoners who have treated social facts according to geometrical methods,

[d–d]MS, 43, 46, 51, 56, 62, 65 contradicts
[e–e]+68, 72
[f–f]MS, 43, 46 must be
[g]43, 46 and [*printer's error? cancelled in* MS]
[h–h]MS those [*printer's error?*]
[i–i]MS, 43, 46, 51, 56, 62 entertained

not admitting [a] any modification of one law by another, must for the present be left out of consideration; because in them this error is complicated with, and is the effect of, another fundamental misconception, of which we have already taken some notice, and which will be [b]further treated of[b] before we conclude. I speak of those who deduce political conclusions not from laws of nature, not from sequences of phenomena, real or imaginary, but from unbending practical maxims. Such, for example, are all who found their [c]theory[c] of politics on what is called abstract right, that is to say, on universal precepts; a pretension of which we have already noticed the chimerical nature. Such, in like manner, are those who make the assumption of a social contract, or any other kind of original obligation, [d]and apply it[d] to particular cases by mere interpretation. But in this the fundamental error is the attempt to treat an art like a science, and to have a deductive art; the irrationality of which will be shown in a future chapter. It will be proper to take our exemplification of the geometrical theory from those thinkers who have avoided this additional error, and who entertain, so far, a juster idea of the nature of political inquiry.

We may cite, in the first instance, those who assume as the principle of their political philosophy that government is founded on fear; that the dread of each other is the one motive by which human beings were originally brought into a state of society, and are still held in it. Some of the earlier scientific inquirers into politics, in particular Hobbes, assumed this proposition, not by implication, but avowedly, as the foundation of their doctrine, and attempted to build a complete philosophy of politics thereupon. It is true that Hobbes [e] did not find this one maxim sufficient to carry him through the whole of his subject, but was obliged to eke it out by the double sophism of an original contract. I call this a double sophism; first, as passing off a fiction for a fact, and, secondly, [f] assuming a practical principle, or precept, as the basis of a theory; which is a *petitio principii*, since (as we noticed in treating of that Fallacy) every rule of conduct, even though it be so binding a one as the observance of a promise, must rest its own [g]foundations[g] on the theory of the subject, and the theory, therefore, cannot rest upon it.

§ 3. [*The interest-philosophy of the Bentham School*] Passing over less important instances, [a]I[a] shall come at once to the most remarkable example afforded by our own times of the geometrical method in politics; emanating from persons who [b]are[b] well aware of the distinction between science and

[a]MS, 43, 46 of
[b-b]MS, 43, 46 treated of more fully
[c-c]MS, 43, 46 theories
[d-d]MS to be applied
[e]MS, 43, 46 (who is so much the most considerable of these, that we need not particularly advert to any of the rest)
[f]MS, 43, 46 as
[g-g]MS foundation
[a-a]MS we
[b-b]MS, 43, 46, 51, 56, 62, 65, 68 were

art; who [c]knew[c] that rules of conduct must follow, not precede, the ascertainment of laws of nature, and that the latter, not the former, is the legitimate field for the application of the deductive method. I allude to the interest-philosophy of the Bentham school.

The profound and original thinkers who are commonly known under this description, founded their general theory of government on one comprehensive premise, namely, that men's actions are always determined by their interests. There is an ambiguity in this last expression; for, as the same philosophers, [d]especially Bentham[d], [e] gave the name of an interest to anything which a person likes, the proposition may be understood to mean only this, that men's actions are always determined by their wishes. In this sense, however, it would not bear out any of the consequences which these [f]writers[f] drew from it; and the word, therefore, in their political reasonings, must be understood to mean (which is also the explanation they themselves, on such occasions, gave of it) what is commonly termed private, or worldly, interest.

Taking the doctrine, then, in this sense, an objection presents itself *in limine* which might be deemed a fatal one, namely, that so sweeping a proposition is far from being universally true. [g]Human beings[g] are not governed in all their actions by their worldly interests. This, however, is by no means so conclusive an objection as it at first appears; because in politics we are for the most part concerned with the conduct, not of individual [h]persons, but either of a series of persons (as a succession of kings), or a body or mass of persons[h], as a nation, an aristocracy, or a representative assembly. And whatever is true of a large majority of mankind, may without much error be taken for true of any succession of persons, considered as a whole, or of any collection of persons in which the act of the majority becomes the act of the whole body. Although, therefore, the maxim is sometimes expressed in a manner unnecessarily paradoxical, the consequences drawn from it will hold equally good if the assertion be limited as follows—Any succession of [i]persons, or the majority of any body of persons[i], will be governed in the bulk of their conduct by their personal interests. We are bound to allow to this school of [j]thinkers[j] the benefit of this more rational statement of their fundamental maxim, which [k]is also[k] in strict conformity to the explanations which, when considered to be called for, have been given by themselves.

The theory goes on to infer, [l]quite correctly[l], that if the actions of mankind are determined in the main by their selfish interests, the only rulers who will govern according to the interest of the governed, are those whose selfish

[c-c]62 know
[d-d]MS Bentham especially
[e]MS, 43, 46 systematically
[f-f]MS, 43, 46 philosophers
[g-g]MS, 43, 46 Men
[h-h]MS, 43, 46 men, but . . . series of men (as . . . mass of men
[i-i]MS, 43, 46 men, or . . . of men
[j-j]MS, 43, 46 philosophers
[k-k]MS, 43, 46 moreover is
[l-l]MS, 43 correctly enough

interests are in accordance with it. And to this is added a third proposition, namely, that no rulers have their selfish interest identical with that of the governed, unless it be rendered so by accountability, that is, by dependence on the will of the governed. In other words (and as the result of the whole), that the desire of retaining or the fear of losing their power, and whatever is thereon consequent, is the sole motive which can be relied on for producing on the part of rulers a course of conduct in accordance with the general interest.

We have thus a fundamental theorem of political science, consisting of three syllogisms, and depending chiefly on two general premises, in each of which a certain effect is considered as determined only by one cause, not by a concurrence of causes. In the one, it is assumed that the actions of average rulers are determined solely by self-interest; in the other, that the sense of identity of interest with the governed, is produced and producible by no other cause than responsibility.

Neither of these propositions is by any means true; the last is extremely wide of the truth.

It is not true that the actions even of average rulers are wholly, or anything approaching to wholly, determined by their personal interest, or even by their own opinion of their personal interest. I do not speak of the influence of a sense of duty, or feelings of philanthropy, motives never to be [m]mainly[m] relied on, though (except in countries or during periods of great moral debasement) they influence almost all rulers in some degree, and some rulers in a very great degree. But I insist only on what is true of all rulers, viz., that the character and course of their actions is largely influenced (independently of personal calculation) by the habitual sentiments and feelings, the general modes of thinking and acting, which prevail throughout the community of which they are members; as well as by the feelings, habits, and modes of thought which characterize the particular class in that community to which they themselves belong. And no one will understand or be able to decipher their system of conduct, who does not take all these things into account. They are also much influenced by the maxims and traditions which have descended to them from other rulers, their predecessors; [n]which maxims and traditions have been known to retain an ascendancy during long periods, even in opposition[n] to the private interests of the rulers for the time being. [o]I[o] put aside the influence of other less general causes. Although, therefore, the private interest of the rulers or of the ruling class is a very powerful force, constantly in action, and exercising the most important influence upon their

[m-m]MS, 43, 46 exclusively
[n-n]MS and which have been known to maintain, during long periods, a successful struggle in a contrary direction] 43, 46 *as* MS . . . a direction contrary
[o-o]MS We

conduct; there is also, in what they do, a large portion which that private interest by no means affords a sufficient explanation of: and even the particulars which constitute the goodness or badness of their government, are in some, and no small degree, influenced by those among the circumstances acting upon them, which cannot, with any propriety, be included in the term self-interest.

Turning now to the other proposition, that responsibility to the governed is the only cause capable of producing [p]in the rulers a sense of identity of interest with the community[p]; this is still less admissible as an universal truth, than even the former. [q]I am not speaking of perfect identity of interest, which is an impracticable chimera; which, most assuredly, responsibility to the people does not give. I[q] speak of identity in essentials; and the essentials are different at different places and times. There are a large number of cases in which those things which it is most for the [r]general interest that the rulers should do, are also those which they are prompted to do by their strongest personal interest, the consolidation of their[r] power. The suppression, for instance, of anarchy and resistance to law,—the complete establishment of the authority of the central government, in a state of society like that of Europe in the middle ages,—is [s]one of the strongest interests[s] of the people, and also of [t]the[t] rulers simply because they are the rulers: and responsibility on their part could not strengthen, though in many conceivable ways it might weaken, the motives prompting them to pursue this object. During the greater part of the reign of Queen Elizabeth, and of many other monarchs who might be named, the sense of identity of interest between the sovereign and the majority of the people was probably stronger than it usually is in responsible governments: everything that the people had most at heart, the monarch had at heart too. Had Peter the Great, or the rugged savages whom he began to civilize, the truest inclination towards the things which were for the real interest of those savages?

I am not here attempting to establish a theory of government, and am not called upon to determine the proportional weight which ought to be given to the circumstances which this school of geometrical politicians left out of their system, and those which they took into it. I am only concerned to show that their method was unscientific; not to measure the amount of error which may have affected their practical conclusions.

It is but justice to them, however, to remark, that their mistake was not

[p-p]MS a sense in the rulers, of identity of interest with them
[q-q]MS, 43 We are not . . . give. We
[r-r]MS, 43, 46 interest of the people that their ruler should do, are also those which he is prompted to do by his strongest personal interest, the consolidation of his
[s-s]MS, 43, 46 the strongest interest
[t-t]MS their

so much one of substance as of form; and [u]consisted in presenting[u] in a systematic shape, and as the scientific treatment of a great philosophical question, what should have passed for that which it really was, the mere polemics of the day. Although the actions of rulers are by no means wholly determined by their selfish interests, it is [v]chiefly[v] as a security against those selfish interests that constitutional checks are required; and for that purpose such checks, in England, and [w]the other nations of modern Europe[w], can in no manner be dispensed with. It is [x]likewise true, that in these same nations, and in the present age, responsibility to the governed[x] is the only means practically available to create a feeling of identity of interest, in the cases, and on the points, where that feeling does not sufficiently exist. To all this, and to the arguments which may be founded on it in favour of measures for the correction of our representative system, I have nothing to object; but I confess my regret, that the small though highly important portion of the philosophy of government, which was wanted for the immediate purpose of serving the cause of parliamentary reform, should have been held forth by [y]thinkers[y] of such eminence as a complete theory.

It is not to be imagined possible, nor is it true in point of fact, that these philosophers regarded the few premises of their theory as including all that is required for explaining social phenomena, or for determining the choice of forms of government and measures of legislation and administration. They were too highly instructed, of too comprehensive intellect, and some of them of too sober and practical a character, for such an error. They would have applied, and did apply, their principles with innumerable allowances. But it is not allowances that are wanted. There is little chance of making due amends in the superstructure of a theory for the want of sufficient breadth in its foundations. It is unphilosophical to construct a science out of a few of the agencies by which the phenomena are determined, and leave the rest to the routine of practice or the sagacity of conjecture. We either ought not to pretend to scientific forms, or we ought to study all the determining agencies equally, and endeavour, so far as it can be done, to include all of them within the pale of the science; else we shall infallibly bestow a disproportionate attention upon those which our theory takes [z]into account[z], while we misestimate the rest, and probably underrate their importance. That the deduc-

[u-u]MS arose from their having presented
[v-v]+56, 62, 65, 68, 72
[w-w]MS, 43, 46 in many other countries
[x-x]MS true, moreover, that in the particular stage of civilization through which Europe is now passing, responsibility to the governed, either express or virtual,] 43, 46 *as* MS . . . passing, either express or virtual responsibility to the governed
[y-y]MS, 43, 46 philosophers
[z-z]MS account of

tions should be from the whole and not from a part only of the laws of nature that are concerned, would be desirable even if those omitted were so insignificant in comparison with the others, that they might, for most purposes and on most occasions, be left out of the account. But this is far indeed from being true in the social science. The phenomena of society do not depend, in essentials, on [a]some[a] one agency or law of human nature, with only inconsiderable modifications from others. The whole of the [b]qualities[b] of human nature influence those phenomena, and there is not one which influences them in a small degree. There is not one, the removal or any great alteration of which would not materially affect the whole aspect of society, and change more or less [c]the sequences of social phenomena generally[c].

The theory which has been the subject of these remarks is in this country at least, the principal [d]cotemporary[d] example of what I have styled the geometrical method of philosophizing in the social science; and our examination of it has, for this reason, been more detailed than [e]would[e] otherwise have been [f]suitable to[f] a work like the present. Having now sufficiently illustrated the two erroneous methods, we shall pass without further preliminary to the true method; that which proceeds (conformably to the practice of the [g]more complex physical sciences[g]) deductively indeed, but by deduction from many, not from one or a very few, original premises; considering each effect as (what it really is) an aggregate result of many causes, operating sometimes through the same, sometimes through different mental agencies, or laws of human nature.

[a-a]MS, 43, 46 any
[b-b]MS, 43, 46 laws
[c-c]MS, 43, 46 most of the principal sequences of the social phenomena
[d-d]MS, 43, 46 contemporary
[e-e]MS, 43, 46, 51 might
[f-f]MS, 43, 46 deemed necessary in] 51 necessary in
[g-g]MS, 43, 46 higher branches of physical science

CHAPTER IX

Of the Physical, or Concrete Deductive Method

§ 1. [*The Direct and Inverse Deductive Methods*] After what has been said to illustrate the nature of the inquiry into [a] social phenomena, the general character of the method proper to that inquiry is sufficiently evident, and needs only to be recapitulated, not proved. However complex the phenomena, all their sequences and coexistences result from the laws of the separate elements. The effect [b] produced, in social phenomena, by any complex set of circumstances, amounts precisely to the sum of the effects of the circumstances taken singly: and the complexity does not arise from the number of the laws themselves, which is not remarkably great; but from the extraordinary number and variety of the data or elements—of the agents which, in obedience to that small number of laws, co-operate towards the effect. The Social Science, therefore (which [c], by a convenient barbarism, has been termed[c] Sociology,) is a deductive science; not, indeed, after the model of geometry, but after that of the [d]more complex[d] physical sciences. It infers the law of each effect from the laws of causation on which [e]that effect[e] depends; not, however, from the law merely of one cause, as in the geometrical method; but by considering all the causes which conjunctly influence the effect, and compounding their laws with one another. Its method, in short, is the Concrete Deductive Method; that of which astronomy furnishes the most perfect, natural philosophy a somewhat less perfect example, and the employment of which, with the adaptations and precautions required by the subject, is beginning to regenerate physiology.

Nor does it admit of doubt, that similar adaptations and precautions are indispensable in sociology. In applying, to that most complex of all studies, what is demonstrably the sole method capable of throwing the light of science even upon phenomena of a far inferior degree of complication, we ought to

[a]MS, 43, 46 the
[b]43, 46 which is
[c-c]MS, 43 I shall henceforth, with M. Comte, designate by the more compact term
[d-d]MS, 43, 46 higher
[e-e]MS it

be aware that the same superior complexity which renders the instrument of Deduction more necessary, renders it also more precarious; and we must be prepared to meet, by appropriate contrivances, this increase of difficulty.

The actions and feelings of human beings in the social state, are, no doubt, entirely governed by psychological and ethological laws: whatever influence any cause exercises upon the social phenomena, it exercises through those laws. Supposing therefore the laws of human actions and feelings to be sufficiently known, there is no extraordinary difficulty in determining from those laws, the nature of the social effects which any given cause tends to produce. But when the question is that of compounding several tendencies together, and computing the aggregate result of many coexistent causes; and especially when, by attempting to predict what will actually occur in a given case, we incur the obligation of estimating and compounding [f] the influences of all the causes which happen to exist in that case; we attempt a task to proceed far in which, [g] surpasses the compass of the human faculties.

If all the resources of science are not sufficient to enable us to calculate *à priori*, with complete precision, the mutual action of three bodies gravitating towards one another; it may be judged with what [h]prospect[h] of success we should endeavour [i] to calculate the result of the conflicting tendencies which are acting in a thousand different directions and promoting a thousand different changes at a given instant in a given society: although we might and ought to be able, from the laws of human nature, to distinguish correctly enough the tendencies themselves, so far as they depend on causes accessible to our observation; and to determine the direction which each of them, if acting alone, would impress upon society, as well as, in a general way at least, to pronounce that some of these tendencies are more powerful than others.

But, without dissembling the necessary imperfections of the *à priori* method when applied to such a subject, neither ought we, on the other hand, to exaggerate them. The same objections, which apply to the Method of Deduction in this its most difficult employment, apply to it, as we formerly showed,* in its easiest; and would even there have been insuperable, if there had not existed, as was then fully explained, an appropriate remedy. This remedy consists in the process which, under the name of Verification, we have characterized as the third essential constituent part of the Deductive Method; that of collating the conclusions of the ratiocination either with the concrete phenomena themselves, or, when such are obtainable, with their empirical laws. The ground of confidence in any concrete deductive science

*Supra, pp. 447ff.

[f]MS, 43, 46 together
[g]MS, 43, 46 certainly
[h-h]MS, 43, 46 prospects
[i]MS, 43, 46 , from the laws of human nature only,

is not the *à priori* reasoning [j]itself, but the accordance[j] between its results and those of observation *à posteriori*. [k]Either[k] of these processes, [l]apart[l] from the other, diminishes in value as the subject increases in complication, and this in so rapid a ratio as soon to become entirely worthless [m]; but the[m] reliance to be placed in the concurrence of the two sorts of evidence, not only does not diminish in anything like the same proportion, but is not necessarily much diminished at all. [n]Nothing more results than[n] a disturbance in the order of precedency of the two processes, sometimes amounting to its actual inversion: insomuch that instead of deducing our conclusions by reasoning, and verifying them by observation, we in some cases [o]begin by obtaining[o] them [p]provisionally[p] from specific experience, and [q]afterwards connect them with the principles of human nature by *à priori* reasonings, which reasonings are thus a[q] real Verification.

The [r] only [s]thinker[s] who, with a competent knowledge of [t]scientific methods in general[t], has attempted to characterize the Method of Sociology, M. Comte, considers this inverse order as inseparably inherent in the nature of sociological speculation. He looks upon the social science as essentially consisting of generalizations from history, verified, not originally suggested, by deduction from the laws of human nature.[*] [u]Though there is a truth contained in this opinion, of which[u] I shall presently endeavour to show the [v]importance[v], I cannot but think that this truth is enunciated in too unlimited a manner, and that there is considerable scope in sociological inquiry for the direct, as well as for the inverse, Deductive Method.

It will, in fact, be shown in the next chapter, that there is a kind of sociological inquiries to which, from their prodigious complication, the method of direct deduction is altogether inapplicable, while by a happy compensation it is precisely in these cases that we are able to obtain the best empirical laws: to these inquiries, therefore, the Inverse Method is exclu-

[*See *Cours*, Vol. IV, 48e Leçon, esp. pp. 450ff.]

j–jMS, 43, 46 , but the consilience
k–kMS Though either
l–lMS, 43, 46 when divorced
m–mMS , the
n–nMS What results is only
o–oMS obtain
p–pMS, 43, 46, 51, 56, 62, 65, 68 conjecturally
q–qMS the *à priori* reasoning by which we afterwards connect them with the principles of human nature is their
rMS, 43 greatest living authority on scientific methods in general, and the
s–sMS, 43, 46 philosopher
t–tMS, 43 those methods
u–uMS, 43 Such an opinion, from such a thinker, deserves the most serious consideration; but though
v–vMS, 43 eminent importance of the truth which it contains] 46 eminent importance

sively adapted. But there are also, as will presently appear, other cases in which it is impossible to obtain from direct observation anything worthy the name of an empirical law; and it fortunately happens that these are the very cases in which the Direct Method is least affected by the objection which undoubtedly must always affect it in a certain degree.

We shall begin, then, by looking at [w]the Social Science[w] as a science of direct Deduction, and considering what can be accomplished in it, and under what limitations, by that mode of investigation. We shall, then, in a separate chapter, examine and endeavour to characterize the inverse process.

§ 2. [*Difficulties of the Direct Deductive Method in the Social Science*] It is [a]evident, in the first place,[a] that Sociology, considered as a system of deductions *à priori*, cannot be a science of positive predictions, but only of tendencies. We may be able to conclude, from the laws of human nature applied to the circumstances of a given state of society, that a particular cause will operate in a certain manner unless counteracted; but we can never be assured to what extent or amount it will so operate, or affirm with certainty that it will not be counteracted; because we can seldom know, even [b]approximately[b], all the agencies which may coexist with it, and still less calculate the collective result of so many combined elements. The remark, however, must here be once more repeated, that knowledge insufficient for prediction may be most valuable for guidance. It is not necessary for the wise conduct of the affairs of society, no more than of any [c]one's[c] private concerns, that we should be able to foresee infallibly the results of what we do. We must seek our objects by means which may perhaps be defeated, and take precautions against dangers which possibly may never be realized. The aim of practical politics is to surround [d]any given society[d] with the greatest possible number of circumstances of which the tendencies are beneficial, and to remove or counteract, as far as practicable, those of which the tendencies are injurious. A knowledge of the tendencies only, though without the power of accurately predicting their conjunct result, gives us to a [e]considerable[e] extent this power.

It would, however, be an error to suppose that even with respect to tendencies, we could arrive in this manner at any great number of propositions which will be true in all societies without exception. [f]Such a supposition would be inconsistent with[f] the eminently modifiable nature of the social phenomena, and the multitude and variety of the circumstances by which

[w-w]MS, 43 Sociology
[a-a]MS, 43 , in the first place, distinctly apparent
[b-b]MS, 43, 46, 51, 56, 62, 65 approximatively
[c-c]MS, 43 man's
[d-d]MS, 43, 46 the society which is under our superintendence
[e-e]MS, 43, 46, 51, 56, 62, 65, 68 certain
[f-f]MS This arises from

they are modified; circumstances never the same, or even nearly the same, in two different societies, or in two different periods of the same society. This would not be so serious an obstacle if, though the causes acting upon society in general are numerous, those which influence any one feature of society were limited in number; for we might then insulate any particular social phenomenon, and investigate its laws without disturbance from the rest. But the truth is the very opposite of this. Whatever affects, in an appreciable degree, any one element of the social state, affects through it all the other elements. The mode of production of all social phenomena is one great case of Intermixture of Laws. We can never either understand in theory or command in practice the condition of a society in any one respect, without taking into consideration its condition in all other respects. There is no social phenomenon which is not more or less influenced by every other part of the condition of the same society, and therefore by every cause which is influencing any other of the contemporaneous social phenomena [g]. There is, in short, what physiologists term a *consensus,*[g] similar to that existing among the various organs and functions of the physical frame of man and the more perfect animals; and constituting one of the many analogies which have rendered universal such expressions as the "body politic" and "body natural." It follows from this *consensus*, that unless two societies could be alike in all the circumstances which surround and influence them, (which would imply their being alike in their previous history,) no portion whatever of [h]the[h] phenomena will, unless by accident, precisely correspond; no one cause will produce exactly the same [i]effects[i] in both. [j]Every cause, as its effect spreads through society, comes somewhere in contact with different sets of agencies, and thus has[j] its effects on some of the social phenomena differently modified; and these differences, by their reaction, produce a difference even in those of the effects which would otherwise have been the same. We can never, therefore, affirm with certainty that a cause which has a particular tendency in one people or in one age will have exactly the same tendency in another, without referring back to our premises, and performing over again for the second age or nation, that analysis of the whole of its influencing circumstances which we had already performed for the first. The deductive science of society [k]will[k] not lay down a theorem, asserting in an universal manner the effect of any cause; but [l]will rather teach[l] us how to frame the proper

[g-g]MS : a *consensus* (as it would be called in the language of physiology)] 43, 46 . There is, in short, a *consensus* (to borrow an expression from physiology)

[h-h]MS, 43, 46, 51 their

[i-i]MS, 43, 46 effect

[j-j]MS For every cause, as its effect spreads through society, is sure to come in contact somewhere with different sets of agencies, and thus to have

[k-k]MS, 43, 46 does

[l-l]MS, 43, 46 rather teaches

theorem for the circumstances of any given case. It [m]will not give[m] the laws of society in general, but the means of determining the phenomena of any given society from the particular elements or data of that society.

All the general propositions [n]which can be framed by[n] the deductive science, are therefore, in the strictest sense of the word, hypothetical. They are grounded on some supposititious set of circumstances, and declare how some given cause [o]would operate in those circumstances, supposing that no others were[o] combined with them. If the set of circumstances supposed have been [p]copied[p] from those of any existing society, the conclusions will be true of that society, provided, and in as far as, the effect of those circumstances shall not be modified by others which have not been taken into the account. If we desire a nearer approach to concrete truth, we can only aim at it by taking, or endeavouring to take, a greater number of individualizing circumstances into the computation.

Considering, however, in how accelerating a ratio the uncertainty of our conclusions increases, as we attempt to take the effect of a greater number of concurrent causes into our calculations; the hypothetical combinations of circumstances on which we construct the general theorems of the science, cannot be made very complex, without so rapidly-accumulating a liability to error as must soon deprive our conclusions of all value. This mode of inquiry, considered as a means of obtaining general propositions, must, therefore, on pain of [q] frivolity, be limited to those classes of social facts which, though influenced like the rest by all sociological agents, are under the *immediate* influence, principally at least, of a few only.

§ 3. [*To what extent the different branches of sociological speculation can be studied apart. Political Economy characterized*] Notwithstanding the universal *consensus* of the social phenomena, whereby nothing which takes place in any part of the operations of society is without its share of influence on every other part; and notwithstanding the paramount ascendancy which the general state of civilization and social progress in any given society must hence exercise over all the partial and subordinate phenomena; it is not the less true that different species of social facts are in the main dependent, immediately and in the first resort, on different kinds of causes; and therefore not only may with advantage, but must, be studied apart: just as in the natural body we study separately the physiology and pathology of each of the principal organs and tissues, though every one is acted upon by the [a]state[a] of all the others: and though the peculiar constitution and general state of

[m-m]MS, 43, 46 does not give us
[n-n]MS, 43, 46 of
[o-o]MS, 43, 46 will operate . . . others are
[p-p]MS, 43, 46 taken
[q]MS, 43, 46 entire
[a-a]MS condition

health of the organism co-operates with, and often preponderates over, the local causes, in determining the state of any particular organ.

On these considerations is grounded the existence of distinct and separate, though not independent, branches or departments of sociological speculation.

There is, for example, one large class of social phenomena, in which the immediately determining causes are principally those which act through the desire of wealth; and in which the psychological law mainly concerned is the familiar one, that a greater gain is preferred to a smaller. I mean, of course, that portion of the phenomena of society which emanate from the industrial, or productive, operations of mankind; and from those of their acts through which the distribution of the products of those industrial operations takes place, in so far as not effected by force, or modified by voluntary gift. [b]By reasoning from that one law of human nature, and from the principal outward circumstances (whether universal or confined to particular states of society) which operate upon the human mind through that law, we may be enabled[b] to explain and predict this portion of the phenomena of society, so far as they depend on that class of circumstances only; overlooking the influence of any other of the circumstances of society; and therefore neither tracing back the circumstances which [c]we do[c] take into account, to their possible origin in some other facts in the social state, nor making allowance for the manner in which any of those other circumstances may interfere with, and counteract or modify, the effect of the former. [d]A department of science may thus be constructed, which[d] has received the name of Political Economy.

The motive which suggests the separation of this portion of the social phenomena from the rest, and the creation of a distinct [e]branch of[e] science relating to them is,—that they do *mainly* depend, at least in the first resort, on one class of circumstances only; and that even when other circumstances interfere, the ascertainment of the effect due to the one class of circumstances alone, is a sufficiently intricate and difficult business to make it expedient to perform it once for all, and then [f]allow for[f] the effect of the modifying circumstances; especially as certain fixed combinations of the former are apt to recur often, in conjunction with ever-varying circumstances of the latter class.

Political Economy, as I have said on another occasion, concerns itself only with

> such of the phenomena of the social state as take place in consequence of the pursuit of wealth. It makes entire abstraction of every other human passion or

[b-b]MS A science is capable of being constructed, which by reasoning . . . law, may enable us

[c-c]MS it does

[d-d]MS This science] 43, 46 A science is thus constructed, which] 51, 56, 62, 65, 68 A science may thus be constructed, which

[e-e]+72

[f-f]MS add

motive; except those which may be regarded as perpetually antagonizing principles to the desire of wealth, namely, aversion to labour, and desire of the present enjoyment of costly indulgences. These it takes, to a certain extent, into its calculations, because these do not merely, like our other desires, occasionally conflict with the pursuit of wealth, but accompany it always as a drag or impediment, and are therefore inseparably mixed up in the consideration of it. Political Economy considers mankind as occupied solely in acquiring and consuming wealth; and aims at showing what is the course of action into which mankind, living in a state of society, would be impelled, if that motive, except in the degree in which it is checked by the two perpetual counter-motives above adverted to, were absolute ruler of all their actions. Under the influence of this desire, it shows mankind accumulating wealth, and employing that wealth in the production of other wealth; sanctioning by mutual agreement the institution of property; establishing laws to prevent individuals from encroaching upon the property of others by force or fraud; adopting various contrivances for increasing the productiveness of their labour; settling the division of the produce by agreement, under the influence of competition (competition itself being governed by certain laws, which laws are therefore the ultimate regulators of the division of the produce); and employing certain expedients (as money, credit, &c.) to facilitate the distribution. All these operations, though many of them are really the result of a plurality of motives, are considered by political economy as flowing solely from the desire of wealth. The science then proceeds to investigate the laws which govern these several operations, under the supposition that man is a being who is determined, by the necessity of his nature, to prefer a greater portion of wealth to a smaller, in all cases, without any other exception than that constituted by the two counter-motives already specified. Not that any political economist was ever so absurd as to suppose that mankind are really thus constituted, but because this is the mode in which science must necessarily proceed. When an effect depends on a concurrence of causes, these causes must be studied one at a time, and their laws separately investigated, if we wish, through the causes, to obtain the power of either predicting or controlling the effect; since the law of the effect is compounded of the laws of all the causes which determine it. The law of the centripetal and that of the [g]projectile[g] force must have been known, before the motions of the earth and planets could be explained, or many of them predicted. The same is the case with the conduct of man in society. In order to judge how he will act under the variety of desires and aversions which are concurrently operating upon him, we must know how he would act under the exclusive influence of each one in particular. There is, perhaps, no action of a man's life in which he is neither under the immediate nor under the remote influence of any impulse but the mere desire of wealth. [h]With respect to those parts of human conduct of which wealth is not even the principal object,[h] to these political economy does not pretend that its conclusions are applicable. But there are also certain departments of human affairs, in which the acquisition of wealth is the main and acknowledged end. It is only of these that political economy takes notice. The manner in which it necessarily proceeds is that of treating the main and acknowledged end as if it were the sole end; which, of all hypotheses equally simple, is the nearest to the truth. The

[g-g]Source, MS, 43, 46, 51, 56, 62, 65 tangential

[h-h]MS, 43 There are many parts . . . object, and [*cf. reading in Collected Works,* Vol. IV, pp. 322[x-x] and 323[y]]

political economist inquires, what are the actions which would be produced by this desire, if within the departments in question it were unimpeded by any other. In this way a nearer approximation is obtained than would otherwise be practicable to the real order of human affairs in those departments. This approximation has then to be corrected by making proper allowance for the effects of any impulses of a different description, which can be shown to interfere with the result in any particular case. Only in a few of the most striking cases (such as the important one of the principle of population) are these corrections interpolated into the expositions of political economy itself; the strictness of purely scientific arrangement being thereby somewhat departed from, for the sake of practical utility. So far as it is known, or may be presumed, that the conduct of mankind in the pursuit of wealth is under the collateral influence of any other of the properties of our nature, than the desire of obtaining the greatest quantity of wealth with the least labour and self-denial, the conclusions of political economy will so far fail of being applicable to the explanation or prediction of real events, until they are modified by a correct allowance for the degree of influence exercised by the other cause.*

[i]Extensive and important practical guidance[i] may be derived, in any given state of society, from general propositions such as those above indicated; even though the modifying influence of the miscellaneous causes which the theory does not take into account, as well as the effect of the general social changes in progress, [j]be provisionally overlooked[j]. And though it has been a very common error of political economists to draw conclusions from the elements of one state of society, and apply them to other states in which many of the elements are not the same; it is even then not difficult, by tracing back the demonstrations, and introducing the new premises in their proper places, to make the same general course of argument which served for the one case, serve for the others too.

For example, it has been greatly the custom of English political economists to discuss the [k] laws of the distribution of the produce of industry, on a supposition which is scarcely realized anywhere out of England and Scotland, namely, that the produce is

shared among three classes, altogether distinct from one another, labourers, capitalists, and landlords; and that all these are free agents, permitted in law and in fact to set upon their labour, their capital, and their land, whatever price they are able to get for it. The conclusions of the science, being all adapted to a society thus constituted, require to be revised whenever they are applied to any other.

*[46] *Essays on some Unsettled Questions of Political Economy*, pp. 137–140 [*Collected Works*, Vol. IV, pp. 321–3].

[i-i]MS, 43 When M. Comte (for of the objections raised by inferior thinkers it is unnecessary here to take account) pronounces the attempt to treat political economy, even provisionally, as a science apart, to be a misapprehension of the scientific method proper to Sociology [*Cours*, Vol. IV, pp. 264ff.]; I cannot but think that he has overlooked the extensive and important practical guidance which

[j-j]MS will of course require to be attended to in its application

[k]MS, 43, 46 natural

They are inapplicable where the only capitalists are the landlords, and the labourers are their property, as in slave countries. They are inapplicable where the [l]almost[l] universal landlord is the state, as in India. They are inapplicable where the agricultural labourer is generally the owner both of the land itself and of the capital, as [m]frequently[m] in France, or of the capital only, as in Ireland.

But though it may often be [n]very[n] justly objected to the existing race of political economists "that they attempt to construct a permanent fabric out of transitory materials; that they take for granted the immutability of arrangements of society, many of which are in their nature fluctuating or progressive, and enunciate with as little qualification as if they were universal and absolute truths, propositions which are perhaps applicable to no state of society except the particular one in which the writer happened to live;" this does not take away the value of the propositions, considered with reference to the state of society from which they were drawn. And even as applicable to other states of society, "it must not be supposed that the science is so incomplete and unsatisfactory as this might seem to prove. Though many of its conclusions are only locally true, its method of investigation is applicable universally [o]; and as whoever[o] has solved a certain number of algebraic equations, can without difficulty solve all others of the same kind, so [p]whoever[p] knows the political economy of England, or even of Yorkshire, knows that of all nations, actual or possible, provided he have good sense enough not to expect the same conclusion to issue from varying premises." Whoever [q]has mastered with the degree of precision which is attainable[q] the laws which, under free competition, determine the rent, profits, and wages, received by landlords, capitalists, and labourers, in a state of society in which the three classes are completely separate, will have no difficulty in determining the very different laws which regulate the distribution of the produce among the classes interested in it, in any of the states of cultivation and landed property set forth in the foregoing extract.*

§ 4. [*Political Ethology, or the science of national character*] I would not here undertake to decide what other hypothetical or abstract sciences similar to Political Economy, may admit of being carved out of the general body of

*The quotations in this paragraph are from a paper written by the author, and published in a periodical in 1834. ["On Miss Martineau's Summary of Political Economy," *Monthly Repository*, VIII (May, 1834), p. 319; in *Collected Works*, IV, pp. 225–6.]

[l-l]+51, 56, 62, 65, 68, 72 [*not in* Source]
[m-m]+68, 72 [*not in* Source]
[n-n]+43, 46, 51, 56, 62, 65, 68, 72
[o-o]MS . As he who] Source, 43, 46 ; and as he who
[p-p]Source, MS, 43, 46 he who
[q-q]MS, 43, 46, 51, 56, 62, 65, 68 is thoroughly master of

the social science; what other portions of the social phenomena are in a sufficiently close and complete dependence, in the first resort, on a peculiar class of causes, to make it convenient to create a preliminary science of those causes; postponing the consideration of the causes which act through them, or in concurrence with them, to a later period of the inquiry. There is however among these separate departments one which cannot be passed over in silence, being of a more comprehensive and commanding character than any of the other branches into which the social science may admit of being divided. Like them, it is directly conversant with the causes of only one class of social facts, but a class which exercises, immediately or remotely, a paramount influence over the rest. I allude to what may be termed Political Ethology, or the [a]theory[a] of the causes which determine the type of character belonging to a people or to an age. Of all the subordinate branches of the social science, this is the most completely in its infancy. The causes of national character are scarcely at all understood, and the effect of institutions or social arrangements upon [b]the character of the people[b] is generally that portion of their effects which is least attended to, and least comprehended. Nor is this wonderful, when we consider the infant state of the Science of Ethology itself, from whence the laws must be drawn, of which the truths of political ethology [c]can be[c] but results and exemplifications.

Yet to whoever well considers the matter, it must appear that the laws of national [d](or collective)[d] character are by far the most important class of sociological laws. In the first place, the character which is formed by any state of social circumstances is in itself the most interesting phenomenon which that state of society can possibly present. Secondly, it is also a fact which enters largely into the production of all the other phenomena. And above all, the character, that is, the opinions, feelings, and habits, of the people, though greatly the results of the state of society which precedes them, are also greatly the causes of the state of society which follows them; and are the power by which all those of the circumstances of society which are artificial, laws and customs for instance, are altogether moulded: customs evidently, laws no less really, either by the direct influence of public sentiment upon the ruling powers, or by the effect which the state of national opinion and feeling has in determining the form of government, and shaping the character of the governors.

As might be expected, the most imperfect part of those branches of [e]social inquiry[e] which have been cultivated as separate sciences, is the theory of the manner in which their conclusions are affected by ethological considerations. The omission is no defect in them as abstract or hypothetical sciences, but it

[a-a]MS, 43, 46 science
[b-b]MS, 43, 46 national character
[c-c]MS, 43, 46, 51, 56, 62, 65 are
[d-d]+51, 56, 62, 65, 68, 72
[e-e]MS, 43 sociology

vitiates them in their practical application as branches of [f]a[f] comprehensive social science. In political economy for instance, empirical laws of human nature are tacitly assumed by English thinkers, which are calculated only for Great Britain and the United States. Among other things, an intensity of competition is constantly supposed, which, as a general mercantile fact, exists in no country in the world except those two. An English political economist, like his countrymen in general, has seldom learned that it is possible that men, in conducting the business of selling their goods over a counter, should care more about their ease or their vanity than about their pecuniary gain. Yet those who know the habits of the Continent of Europe are aware how apparently small a motive often outweighs the desire of money-getting, even in the operations which have money-getting for their direct object. The more highly the science of ethology is cultivated, and the better the diversities of [g]individual and[g] national character are understood, the smaller, probably, will the number of propositions become, which it will be considered safe to build on as universal principles of human nature.

These considerations show that the process of dividing off the social science into compartments, in order that each may be studied separately, and its conclusions afterwards corrected for practice by the modifications supplied by the others, must be subject to at least one important limitation. Those portions alone of the social phenomena can with advantage [h]be made[h] the subjects, even provisionally, of distinct branches of science, into which the diversities of character between different nations or different [i]times[i] enter as influencing causes only in a secondary degree. Those phenomena, on the contrary, with which the influences of the ethological state of the people are mixed up at every step (so that the connexion of effects and causes cannot be even rudely marked out without taking those influences into consideration) could not with any advantage, nor without great disadvantage, be treated independently of political ethology, nor, therefore, of all the circumstances by which the qualities of a people are influenced. For this reason (as well as for others which will hereafter appear) there can be no separate Science of Government; that [j]being[j] the fact which, of all others, is most mixed up, both as cause and effect, with the qualities of the particular people or of the particular age. All questions respecting the tendencies of forms of government must stand part of the general science of society, not of any separate branch of it.

This general Science of Society, as distinguished from the separate departments of the science (each of which asserts its conclusions only conditionally,

[f-f]MS, 43, 46 the
[g-g]+51, 56, 62, 65, 68, 72
[h-h]MS form
[i-i]MS ages,
[j-j]MS is, of

subject to the paramount control of the laws of the general science) [k]now remains to be characterized[k]. And as will be shown presently, nothing of a really scientific character is here possible, except by the inverse deductive method. But before we quit the subject of those sociological speculations which proceed by way of direct deduction, we must examine in what relation they stand to that indispensable element in all deductive sciences, Verification by Specific Experience— [l] comparison between the conclusions of reasoning and the results of observation.

§ 5. [*The Empirical Laws of the Social Science*] We have seen that, in most deductive sciences, and among the rest in Ethology itself, which is the immediate foundation of the Social Science, a preliminary work of preparation is performed on the observed facts, to fit them for being rapidly and accurately collated (sometimes even for being collated at all) with the conclusions of theory. This preparatory treatment consists in finding general propositions which express concisely what is common to large classes of observed facts: and these are called the empirical laws of the phenomena. We have, [a]therefore[a], to inquire, whether any similar preparatory process can be performed on the facts of the social science; whether there are any empirical laws in history or statistics.

In statistics, it is evident that empirical laws may sometimes be traced; and [b] the tracing them forms an important part of that system of indirect observation on which we must often rely for the data of the Deductive Science. The process of the science consists in inferring effects from their causes; but we have often no means of observing the causes, except through the medium of their effects. [c]In such cases the deductive science is[c] unable to predict the effects, for want of the necessary data; it can [d]determine[d] what causes are capable of producing any given effect, but not with what frequency and in what quantities those causes exist. An instance in point is afforded by a newspaper now lying before me. A statement was furnished by one of the official assignees in bankruptcy, showing, among the various bankruptcies which it had been his duty to investigate, in how many cases the losses had been caused by misconduct of different kinds, and in how many by unavoidable misfortunes. The result was, that the number of failures caused by misconduct greatly preponderated over those arising from all other causes whatever. Nothing but specific experience could have given sufficient ground for a conclusion to this purport. To collect, therefore, such empirical laws

[k-k]MS, 43, 46 it now remains for us to characterize
[l]MS, 43, 46 the
[a-a]MS then
[b]MS that
[c-c]MS The deductive science is then
[d-d]MS, 43, 46 tell us

(which are never more than approximate generalizations) from direct observation, is an important part of the process of sociological inquiry.

The experimental process is not here to be regarded as a distinct road to the truth, but as a means (happening accidentally to be the only, or the best, available) for obtaining the [e]necessary data for the deductive science[e]. When the immediate causes of social facts are not open to direct observation, the empirical law of the effects gives us the empirical law (which in that case is all that we can obtain) of the causes likewise. But those immediate causes depend on remote causes; and the empirical law, obtained by this indirect mode of observation, can only be relied on as applicable to unobserved cases, so long as there is reason to think that no change has taken place in any of the remote causes on which the immediate causes depend. In making use, therefore, of even the best statistical generalizations for the purpose of inferring (though it be only conjecturally) that the same empirical laws will hold in any new case, it is necessary that we be [f] well acquainted with the remoter causes, in order that we may [g] avoid applying the empirical law to cases which differ in any of the circumstances on which the truth of the law ultimately depends. And thus, even where conclusions derived from specific observation are available for practical inferences in new cases, it is necessary that the deductive science should stand sentinel over the whole process; that it should be constantly referred to, and its sanction obtained to every inference.

The same thing holds true of all generalizations which can be grounded on history. Not only there are such generalizations, but it will presently be shown that the general science of society, which inquires into the laws of succession and coexistence of the great facts constituting the state of society and civilization at any time, can proceed in no other manner than by making such generalizations—afterwards to be confirmed by connecting them with the psychological and ethological laws on which they must really depend.

§ 6. [*The Verification of the Social Science*] But (reserving this question for its proper place) in those more special [a] inquiries which form the subject of the separate branches of the social science, this twofold logical process and reciprocal verification is not possible: specific experience affords nothing amounting to empirical laws. This is particularly the case where the object is to determine the effect of any one [b]social[b] cause among a great number acting simultaneously; the effect, for example, of corn laws, or of a prohibitive commercial system generally. Though it may be perfectly certain, from theory, what *kind* of effects corn laws must produce, and in what general

[e–e]MS, 43, 46 data which the deductive science cannot do without
[f]MS, 43, 46 perfectly
[g]MS, 43, 46 scrupulously
[a]MS, 43 sociological
[b–b]MS, 43 sociological

direction their influence must tell [c] upon industrial prosperity; their effect is yet of necessity so much disguised by the similar or contrary effects of [d]other influencing agents[d], that specific experience can at most only show that [e]on[e] the average of some great number of instances, the cases where there were corn laws exhibited the effect in a greater degree than those where there were not. Now the number of instances necessary to [f]exhaust[f] the whole round of combinations of the various influential circumstances, and thus afford a fair average, never can be obtained [g]. Not only we can never learn with sufficient authenticity the facts of so many instances, but[g] the world itself does not afford them in sufficient numbers, within the limits of the given state of society and civilization which such inquiries always presuppose. Having thus no previous empirical generalizations with which to collate the conclusions of theory, the only mode of direct verification which remains is to compare those conclusions with the result of an individual experiment or instance. But here the difficulty is equally great. For in order to verify a theory by an experiment, the circumstances of the experiment must be exactly the same with those contemplated in the theory. But in social phenomena the circumstances of no two [h]cases[h] are exactly alike. A trial of corn laws in another country or in a former generation, would go a very little way towards verifying [i]a[i] conclusion drawn respecting their effect in this generation and in this country. It thus happens, in most cases, that the only [j]individual instance really fitted to verify the predictions of theory is the very[j] instance for which the predictions were made; and the verification comes too late to be of any avail for practical guidance.

Although, however, direct verification is impossible, there is an indirect verification, which is scarcely of less value, and which is always practicable. [k]The conclusion drawn as to the individual case, can only be directly verified in that case[k]; but it is verified indirectly, by the verification of other conclusions, drawn in other individual cases from the same laws. The experience which comes too late to verify the particular proposition to which it refers, is not too late to help towards verifying the general sufficiency of the theory. The test of the degree in which the science affords safe ground for predicting

[c]MS , among so many other influencing agents,
[d-d]MS those other causes
[e-e]MS, 43, 46, 51, 56, 62, 65 in
[f-f]MS. 43, 46, 51, 56, 62, 65 take in
[g-g]MS ; not only because we . . . but because
[h-h]MS, 43, 46, 51, 56 experiments
[i-i]MS the
[j-j]MS instance . . . very individual
[k-k]MS The deductive science, as has been seen, does not so much furnish us with general truths, as enable us to discover the truth in each individual case, from general premisses. Now the conclusion . . . that case, & therefore too late for the verification to be of any use

(and consequently for practically dealing with) what has not yet happened, is the degree in which it would have enabled us to predict what has actually occurred. Before our theory of the influence of a particular cause, in a given state of circumstances, can be [l]entirely[l] trusted, we must be able to explain and account for the existing state of all that portion of the social phenomena which that cause has a tendency to influence. If, for instance, we would apply our speculations in political economy to the prediction or guidance of the phenomena of any country, we must be able to explain all the mercantile or industrial facts of a general character, appertaining to the present state of that country: to point out causes sufficient to account for all of them, and prove, or show good ground for supposing, that [m]these[m] causes [n]have really existed[n]. If we cannot do this, it is a proof either that the facts which ought to be taken into account [o] are not yet completely known to us, or that although we know the facts, we are not masters of a sufficiently perfect theory to enable us to assign their consequences. In either case we are not, in the present state of our knowledge, [p]fully competent to draw conclusions,[p] speculative or practical, for that country. In like manner, if we would attempt to judge of the effect which any political institution would have, supposing that it could be introduced into any given country; we must be able to show that the existing state of the practical government of that country, and of whatever else depends thereon, together with the particular character and tendencies of the people, and their state in respect to the various elements of social well-being, are such as the institutions they have lived under, in conjunction with the other circumstances of their nature or of their position, were calculated to produce.

[q]To prove (in short)[q] that our science, and our knowledge of the particular case, render us competent to predict the future, we must show that they would have enabled us to predict the present and the past. If there be anything which we could not have predicted, this constitutes a residual phenomenon, requiring further study for the purpose of explanation; and we must either search among the circumstances of the particular case until we find one which, on the principles of our existing theory, accounts for the unexplained phenomenon, or we must turn back, and seek the explanation by an extension and improvement of the theory itself.

[l-l]+56, 62, 65, 68, 72
[m-m]MS those [*printer's error?*]
[n-n]MS, 43, 46, 51, 56, 62, 65 did really exist
[o]MS in drawing our conclusions,
[p-p]MS, 43, 46 competent to draw conclusions, either
[q-q]MS, 43 It is therefore well said by M. Comte [*Cours*, Vol. IV, pp. 460ff.], that in order to prove

CHAPTER X

Of the Inverse Deductive, or Historical Method

§ 1. [*Distinction between the general Science of Society, and special sociological inquiries*] There are two kinds of sociological inquiry. In the first kind, the question proposed is, what effect will follow from a given cause, a certain general condition of social circumstances being presupposed. As, for example, what would be the effect of imposing or of repealing corn laws, of abolishing monarchy or introducing universal suffrage, in the present condition of society and civilization in any European country, or under any other given supposition with regard to the circumstances of society in general: without reference to the changes which might take place, or which may already be in progress, in those circumstances. But there is also a second inquiry, namely, what are the laws which determine those general circumstances themselves. In this last the question is, not what will be the effect of a given cause in a certain state of society, but what [a]are the causes which produce, and the phenomena which[a] characterize, States of Society generally. In the solution of this question consists the general Science of Society; by which [b] the conclusions of the other and more special kind of inquiry must be limited and controlled.

§ 2. [*What is meant by a State of Society?*] In order to conceive correctly the scope of this general science, and distinguish it from the subordinate departments of sociological speculation, it is necessary to fix [a] the ideas attached to the phrase, "a State of Society." What is called a state of society, is the [b]simultaneous[b] state of all the greater social facts or phenomena. Such are, the degree of knowledge, and of intellectual and moral culture, existing in the community, and in every class of it; the state of industry, of wealth and

[a–a]MS causes produce, and what phenomena
[b]MS, 43, 46 all
[a]MS, 43, 46 with precision
[b–b]MS contemporaneous

its distribution; the habitual occupations of the community; their division into classes, and the relations of those classes to one another; the common beliefs which they entertain on all the subjects most important to [c]mankind[c], and the degree of assurance with which those beliefs are held; their tastes, and the character and degree of their æsthetic development; their form of government, and the more important of their laws and customs. The condition of all these things, and of many more which will [d]readily[d] suggest themselves, constitute the state of society or the state of civilization at any given time.

When states of society, and the causes which produce them, are spoken of as a subject of science, it is implied that there exists a natural correlation among these different elements; that not every variety of combination of these general social facts is possible, but only certain combinations; that, in short, there exist Uniformities of Coexistence between the states of the various social phenomena. And such is the truth; as is indeed a necessary consequence of the influence exercised by every one of those phenomena over every other. It is a fact implied in the *consensus* of the various parts of the social body.

States of society are like different constitutions or different ages in the physical frame; they are conditions not of one or a few organs or functions, but of the whole organism. Accordingly, the information which we possess respecting past ages, and respecting the various states of society now existing in different regions of the earth, does, when duly analysed, exhibit [e] uniformities. It is found that when one of the features of society is in a particular state, a state of [f]many[f] other features, more or less precisely determinate, always [g]or usually[g] coexists with it.

But the uniformities of coexistence obtaining among phenomena which are effects of causes, must (as we have so often observed) be [h] corollaries from the laws of causation by which [i]these[i] phenomena are [j]really[j] determined. The mutual correlation between the different [k]elements[k] of each state of society, is therefore a derivative law, resulting from the laws which regulate the succession between one state of society and another; for the proximate cause of every state of society is the state of society immediately preceding it. The fundamental problem, therefore, of [l]the social science,[l] is to find the laws according to which any state of society produces the state which succeeds it and takes its place. This opens the great and vexed question of the progressiveness of man and society; an idea involved in every just conception of social phenomena as the subject of a science.

c–cMS man
d–dMS, 43, 46, 51 spontaneously
eMS, 43, 46, 51, 56 such
f–fMS, 43, 46 all the
g–g+46, 51, 56, 62, 65, 68, 72
hMS, 43, 46 mere
i–iMS those [*printer's error?*]
j–jMS, 43, 46 actually
k–kMS parts
l–lMS, 43 sociology

§ 3. [*The Progressiveness of Man and Society*] It is one of the characters, not absolutely peculiar to the sciences of human nature and society, but belonging to them in a peculiar degree, to be conversant with a subject-matter whose properties are changeable. I do not mean changeable from day to day, but from age to age; so that not only the qualities of individuals vary, but those of the majority are not the same in one age as in another.

The principal cause of this peculiarity is the extensive and constant reaction of the effects upon their causes. The circumstances in which mankind are placed, operating according to their own laws and to the laws of human nature, form the characters of the [a]human beings; but the human beings[a], in their turn, mould and shape the circumstances for themselves and for those who come after them. From this reciprocal action there must necessarily result either a cycle or a progress. In astronomy also, every fact is at once effect and cause; the successive positions of the various heavenly bodies produce changes both in the direction and in the intensity of the forces by which those positions are determined. But in the case of the solar system, these mutual actions bring round again, after a certain number of changes, the former state of circumstances; which of course leads to the perpetual recurrence of the same series in an unvarying order. Those bodies, in short, revolve in orbits: but there are (or, conformably to the laws of astronomy, there might be) others which, instead of an orbit, describe a [b]trajectory—[b] a course not returning into itself. One or other of these must be the type to which human affairs must [c] conform.

One of the thinkers who earliest conceived the succession of historical events as subject to fixed laws, and endeavoured to discover these laws by an analytical survey of history, Vico, the celebrated author of the *Scienza Nuova*,[*] adopted the former of these opinions. He conceived the phenomena of human society as revolving in an orbit; as going through periodically the same series of changes. Though there were not wanting circumstances tending to give some plausibility to this view, it would not bear a close scrutiny: and those who have succeeded Vico in this kind of speculations have universally adopted the idea of a trajectory or progress, in lieu of an orbit or cycle.

The words Progress and Progressiveness are not here to be understood as synonymous with improvement and tendency to improvement. It is conceivable that the laws of human nature might determine, and even necessitate, a certain series of changes in man and society, which might not in every case, or which might not on the whole, be improvements. It is my belief indeed

[*Giovanni Battista Vico. *Principi di una scienza nuova*. Naples: Mosca, 1725.]

[a-a]MS, 43, 46 men; but the men
[b-b]MS, 43, 46, 51, 56, 62, 65 trajectory, or
[c]MS, 43, 46 also

that the general tendency is, and will continue to be, saving occasional [d]and temporary[d] exceptions, one of improvement; a tendency towards a better and happier state. [e]This, however,[e] is not a question of the method of the social science, but [f]a theorem[f] of the science itself. For our purpose it is sufficient, that there is a progressive change both in the character of the human race, and in their outward circumstances so far as moulded by themselves: that in each successive age the principal phenomena of society are different from what they were in the age preceding, and still more different from any previous [g]age: the periods which most distinctly mark these successive changes being[g] intervals of one generation, during which a new set of human beings have been educated, have grown up from childhood, and taken possession of society.

The progressiveness of the human race is the foundation on which a method of philosophizing in the social science has been of late years erected, far superior to either of the two modes which had previously been prevalent, the chemical or experimental, and the geometrical modes. This method, which is now generally adopted by the most advanced thinkers on the Continent, [h] consists in attempting, by a study and analysis of the general facts of history, to discover (what these philosophers term) the law of progress: which law, once ascertained, must according to them enable us to predict future events, just as after a few terms of an infinite series in algebra we are able to detect the principle of regularity in their [i]formation[i], and to predict the rest of the series to any number of terms we please. The principal aim of historical speculation in France, of late years, has been to ascertain this law. But while I gladly acknowledge the great services which have been rendered to historical knowledge by this school, I cannot but deem them [j]to be mostly[j] chargeable with a fundamental misconception of the true method of social philosophy. The misconception [k]consists in[k] supposing that the order of succession which we may be able to trace among the different states of society and civilization which history presents to us, even if that order were more rigidly uniform than it has yet been proved to be, could ever amount to a law of nature. It can only be an empirical law. The succession of states of the human mind and of human society cannot have an independent law of its own; it must depend on the psychological and ethological laws which govern the action of circumstances on men and of men on circumstances. It is con-

[d-d]+51, 56, 62, 65, 68, 72
[e-e]MS, 43 But this
[f-f]MS, 43, 46 an ultimate result
[g-g]MS, 43 age. The periods at which these successive changes are most apparent (according to the judicious remark of M. Comte [*Cours*, Vol. IV, pp. 635ff.]) are
[h]MS, 43, 46 and especially in France,
[i-i]MS, 43, 46, 51, 56 recurrence
[j-j]MS, 43 (with the single exception of M. Comte) to be
[k-k]MS is that of

ceivable that those laws [l]might[l] be such, and the general circumstances of the human race such, as to determine the successive transformations of man and society to one given and unvarying order. But even if the case [m]were[m] so, it cannot be the ultimate aim of science to discover an empirical law. Until that law [n]could be connected with the psychological and ethological laws on which it must depend, and, by the consilience of deduction *à priori* with historical evidence, could be converted from an empirical law into a scientific one, it could not[n] be relied on for the prediction of future events, beyond, at [o]most[o], strictly adjacent cases. [p] M. Comte alone [q], among the new historical school,[q] has seen the necessity of thus connecting all our generalizations from history with the laws of human nature [r].

§ 4. [*The laws of the succession of states of society can only be ascertained by the Inverse Deductive Method*] But, while it is an imperative rule never to introduce any generalization from history into the social science unless sufficient grounds can be pointed out for it in human nature, I do not think any one will contend that it would have been possible, setting out from the principles of human nature and from the general circumstances of [a]the position of our species[a], to determine *à priori* the order in which human development must take place, and to predict, consequently, the general facts of history up to the present time. [b]After[b] the first few terms of the series, the influence exercised over each generation by the generations which preceded it, becomes [c](as is well observed by the writer last referred to)[c][*] more and more preponderant over all other influences; until at length what we now are and do, is in a very small degree the result of the universal circumstances of the human race, or even of our own circumstances acting through the

[*See Comte, *Cours*, Vol. IV, pp. 450–1, and, for this passage generally, pp. 363–470.]

[l-l]MS, 43, 46 may
[m-m]MS, 43, 46 be
[n-n]MS, 43, 46 can be . . . it depends, and . . . evidence, can be . . . it cannot
[o-o]MS least
[p]MS, 43, 46 Now,
[q-q]+46, 51, 56, 62, 65, 68, 72
[r]MS, 43, 46 ; and he alone, therefore, has arrived at any results truly scientific; though in the speculations of others there will be found many happy *aperçus*, and valuable hints for future philosophers
[a-a]MS, 43, 46 man's position in the universe
[b-b]MS, 43 The initial stages of human progress,—when man, as yet unmodified by society, and characterized only by the instincts resulting directly from his organization, was acted upon by outward objects of a comparatively simple and universal character, —might indeed, as M. Comte remarks, be deduced from the laws of human nature; which moreover is the only possible mode of ascertaining them, since of that form of human existence no direct memorials are preserved. But (as he justly observes) after] 46 *as* MS . . . indeed, as the same philosopher remarks . . . *as* MS
[c-c]+51, 56, 62, 65, 68, 72

original qualities of our species, but mainly of the qualities produced in us by the whole previous history of humanity. So long a series of actions and reactions between Circumstances and Man, each successive term being composed of an ever greater number and variety of parts, could not possibly be [d]computed by human faculties from the elementary laws which produce it[d]. The mere length of the series would be a sufficient obstacle, since a slight error in any one of the terms would augment in rapid progression at every subsequent step.

If, therefore, the series of the effects themselves did not, when examined as a whole, manifest any regularity, we should in vain attempt to construct a general science of society [e]. We must in that case[e] have contented ourselves with that subordinate order of sociological speculation formerly noticed, namely, with endeavouring to ascertain what would be the effect of the introduction of any new cause, in a state of society supposed to be fixed; a knowledge sufficient for [f]the more common[f] exigencies of daily political practice, but liable to fail in all cases in which the progressive movement of society is one of the influencing elements; and therefore more precarious in proportion as the case is more important. But since both the natural varieties of mankind, and the original diversities of local circumstances, are much less considerable than the points of agreement, there will naturally be a certain degree of uniformity in the progressive development of [g]the species and of its[g] works. And this uniformity [h] tends to become greater, not less, as society advances; since the evolution of each people, which is at first determined exclusively by the nature and circumstances of that people, is gradually brought under the influence (which becomes stronger as civilization advances) of the other nations of the earth, and of the circumstances by which they have been influenced. History accordingly does, when judiciously examined, afford Empirical Laws of Society. And the problem of general sociology is to ascertain these, and connect them with the laws of human nature, by deductions [i]showing[i] that such were the derivative laws naturally to be expected as the consequences of those ultimate ones.

It is, indeed, [j]hardly ever[j] possible, even after history has suggested the derivative law, to demonstrate *à priori* that such was the only order of succession or of coexistence in which the effects could, consistently with the laws of human nature, have been produced. We can at most make out that there were strong *à priori* reasons for expecting it, and that no other order of

[d-d]MS, 43, 46 calculated from the elementary laws which produce it, by merely human faculties

[e-e]MS , & must

[f-f]MS, 43, 46 most of the ordinary

[g-g]MS, 43, 46 man and of his

[h]MS, 43 (as M. Comte remarks with much justice)

[i-i]MS sufficient to shew,

[j-j]MS, 43, 46 in most cases, hardly

succession or coexistence would have been [k] so likely to result from the nature of man and [l]the general circumstances of his position. Often we cannot do even this; we cannot even show that what did take place was probable *à priori*, but only that it was possible.[l] This, however,—which, in the Inverse Deductive Method that we are now characterizing, is a real process of verification,—is as indispensable [m], as verification by specific experience [n]has been shown to be,[n] where the conclusion is originally obtained by the direct way of deduction. The empirical laws must be the result of but a few instances, since few nations have ever attained at all, and still fewer by their own independent development, a high stage of social progress. If, therefore, even one or two of these few instances be insufficiently known, or imperfectly analysed into [o]their[o] elements, and therefore not adequately compared with other instances, nothing is more probable than that a wrong empirical law will [p]emerge[p] instead of the right one. Accordingly, the most erroneous generalizations are continually made from the course of history: not only in this country, where history cannot yet be said to be at all cultivated as a science, but in other countries, where it is so cultivated, and by persons well versed in it. The only check or corrective is, constant verification by psychological and ethological laws. We may add to this, that no one but a person competently skilled in those laws is capable of preparing the materials for historical generalization, by analysing the facts of history, or even by observing the social phenomena of his own time [q]. No[q] other will be aware of the comparative importance of different facts, nor consequently know what facts [r]to look for, or[r] to observe; still less will he be capable of estimating the evidence of [s]facts[s] which, as is the case with most, cannot be [t]ascertained by direct observation or learnt from testimony[t], but must be inferred from marks.

§ 5. [*Social Statics, or the science of the Coexistences of Social Phenomena*] The Empirical Laws of Society are of two kinds; some are uniformities of coexistence, some of succession. According as the science is occupied in ascertaining and verifying the former sort of uniformities or the latter, M. Comte gives it the title of Social Statics, or of Social Dynamics; conformably to the distinction in mechanics between the conditions of equilibrium and those of movement; or in biology, between the laws of organization and those

[k]MS, 43, 46 by any means
[l–l]MS, 43, 46 his position upon earth.
[m]MS, 43, 46 (to be more so is impossible)
[n–n]+43, 46, 51, 56, 62, 65, 68, 72
[o–o]MS, 43 its
[p–p]MS, 43, 46, 51, 56 result
[q–q]MS : for no
[r–r]MS, 43, 46 he is to look out for, or what
[s–s]MS those] 43, 46, 51, 56 those facts
[t–t]MS, 43, 46 observed directly

of life. The first branch of the science ascertains the conditions of stability in the social union: the second, the laws of progress. Social Dynamics is the theory of Society considered in a state of progressive movement; while Social Statics is the theory of the *consensus* already spoken of as existing among the different parts of the social organism; in other words, the theory of the mutual actions and reactions of contemporaneous social phenomena;

making* provisionally, as far as possible, abstraction, for scientific purposes, of the fundamental movement which is at all times gradually modifying the whole of them.

In this first point of view, [b] the previsions of sociology will [c] enable us to infer one from another (subject to ulterior verification by direct observation) the various characteristic marks of each distinct mode of social existence; in a manner essentially analogous to what is now habitually practised in the anatomy of the physical body. This preliminary aspect, therefore, of political science, of necessity supposes that (contrary to the existing habits of philosophers) each of the numerous elements of the social state, ceasing to be looked at independently and absolutely, shall be always and exclusively considered relatively to all the other elements, with the whole of which it is united by mutual interdependence. It would be superfluous to insist here upon the great and constant utility of this branch of sociological speculation. It is, in the first place, the indispensable basis of the theory of social progress [d] . It may, moreover, be employed, immediately, and of itself, to supply the place, provisionally at least, of direct observation, which in many cases is not always practicable for some of the elements of society, the real condition of which [e]may however[e] be sufficiently judged of by means of the relations which connect them with others previously known. The history of the sciences may give us some notion of the habitual importance of this auxiliary resource, by reminding us, for example, how the vulgar errors of mere erudition concerning the pretended acquirements of the ancient Egyptians in the higher astronomy, were irrevocably dissipated (even before sentence had been passed on them by a sounder erudition) from the single consideration of the inevitable connexion between the general state of astronomy and that of abstract geometry, then evidently in its infancy. It would be easy to cite a multitude of analogous cases, the character of which could admit of no dispute. In order to avoid exaggeration, however, it should be remarked, that these necessary relations among the different aspects of society cannot, from their very nature, be so simple and precise that the results observed could only have arisen from some one mode of mutual co-ordination. Such a notion, already too narrow in the science of life, would be completely at variance with the still more complex nature of sociological speculations. But the exact estimation of these limits of variation, both in the healthy and in the morbid state, constitutes, at least as much as in the anatomy of the natural body,

[a]*[46] *Cours de Philosophie Positive*, Vol. IV, pp. 325–9.[a]

[a–a]MS, 43 [*footnote appears in variant* [b] *below*]
[b]MS, 43 ," continues M. Comte*, " [*footnote as above*]
[c]Source, MS have for their destination to [Source *in French*]
[d]Source, MS, 43, 46 , every rational conception of which presupposes the continued preservation of the corresponding social organism [Source *in French*]
[e–e]MS however may

an indispensable complement to every theory of Sociological Statics; without which the indirect exploration above spoken of would often lead into error.

This is not the place for methodically demonstrating the existence of a necessary relation [f]among[f] all the possible aspects of the same social organism; a point on which, [g] in principle at least, there is now little difference of opinion among sound thinkers. From whichever of the social elements we choose to set out, we may easily recognise that it has always a connexion, more or less immediate, with all the other elements, even with those which at first sight appear the most independent of it. The dynamical consideration of the progressive development of civilized humanity, affords, no doubt, a still more efficacious means of effecting this interesting verification of the *consensus* of the social phenomena, by displaying the manner in which every change in any one part, operates immediately, or very speedily, upon all the rest. But this indication may be preceded, or at all events followed, by a confirmation of a purely statical kind; for, in politics as in mechanics, the communication of motion from one object to another proves a connexion between them. Without descending to the minute interdependence of the different branches of any one science or art, is it not evident that among the different sciences, as well as among most of the arts, there exists such a connexion, that if the state of any one well-marked division of them is sufficiently known to us, we can with real scientific assurance infer, from their necessary correlation, the contemporaneous state of every one of the others? By a further extension of this consideration, we may conceive the necessary relation which exists between the condition of the sciences in general and that of the arts in general, except that the mutual dependence is less intense in proportion as it is more indirect. The same is the case, when, instead of considering the aggregate of the social phenomena in some one people, we examine it simultaneously in different contemporaneous nations; between which the perpetual reciprocity of influence, especially in modern times, cannot be contested, though the *consensus* must in this case be ordinarily of a less decided character, and must decrease gradually with the affinity of the cases and the multiplicity of the points of contact, so as at last, in some cases, to disappear almost entirely; as for example between Western Europe and Eastern Asia, of which the various general states of society appear to have been hitherto almost independent of one another.

[h]These remarks are followed by illustrations of[h] one of the most important, and until lately, [i] most neglected, of the [j]general[j] principles which, in this division of the social science, may be considered as established; namely, the necessary correlation between the form of government existing in any society and the contemporaneous state of civilization: a natural law which stamps the endless discussions and innumerable theories respecting forms of govern-

[f-f]MS, 43, 46, 51, 56, 62, 65 between
[g]Source, MS, 43, 46 moreover, [Source *in French*]
[h-h]MS, 43 M. Comte proceeds to illustrate, with his usual sagacity and discrimination,] 46 I must refer the reader to the original work for the illustrations which follow, of
[i]MS one of the
[j-j]MS, 43, 46 great

ment in the abstract, as fruitless and worthless, [k]for any other purpose than as a preparatory treatment of materials to be afterwards used for the construction of[k] a better philosophy.

As already remarked, one of the main results of the science of social statics would be to ascertain the requisites of stable political union. There are some circumstances which, being found in all societies without exception, and in the greatest degree where the social union is most complete, may be considered (when psychological and ethological laws confirm the indication) as conditions of the existence of [l]the complex phenomenon called a State[l]. For example, no [m]numerous[m] society has ever been held together without laws, or usages equivalent to them; without tribunals, and an organized force of some sort to execute their decisions. There have always been [n]public authorities[n] whom, with more or less strictness and in cases more or less accurately defined, the rest of the community obeyed, or according to general opinion were bound to obey. By following out this course of inquiry we [o]shall[o] find a number of requisites, which have been present in every society that has [p]maintained a collective existence, and on the cessation of which it has either merged in some other society, or reconstructed itself on[p] some new basis, in which the conditions were conformed to. [q]Although[q] these results, obtained by comparing different forms and states of society, amount in themselves only to empirical laws; [r]some of them[r], when once suggested, are found to follow with so much probability from general laws of human nature, that the consilience of the two processes raises the evidence to [s] proof, and the generalizations to the rank of scientific truths.

This seems to be affirmable (for instance) of the conclusions arrived at in the following passage; [t]extracted, with some alterations, from[t] a criticism on the negative philosophy of the eighteenth century,* and which I quote,

*[62] Since reprinted entire in *Dissertations and Discussions*, as the concluding paper of the first volume. ["Coleridge," *Dissertations and Discussions*, Vol. I, pp. 393–466; in *Essays on Ethics, Religion and Society*, Vol. X of *Collected Works*. Toronto: University of Toronto Press, 1969, pp. 117–63.]

[k–k]MS save only (in some few of the more remarkable cases) as a not wholly uninstructive preparatory treatment of some small portion of what may be afterwards used as material for] 43, 46 *as* MS . . . as a preparatory . . . *as* MS
[l–l]MS, 43, 46 society
[m–m]+51, 56, 62, 65, 68, 72
[n–n]MS, 43, 46 a chief, or chiefs,
[o–o]MS, 43, 46 should
[p–p]MS, 43, 46 held together; and on the cessation of which it has ceased to be a society, or has reconstructed itself as such upon
[q–q]MS And although
[r–r]MS there are some of them which
[s]MS, 43, 46 complete
[t–t]MS, 43, 46 forming part of

though (as in some former instances) from myself, because I have no better way of illustrating the conception I have formed of the kind of theorems [u]of which sociological statics would consist[u].

The very first element of the social union, obedience to a government of some sort, has not been found so easy a thing to establish in the world. Among a timid and spiritless race like the inhabitants of the vast plains of tropical countries, passive obedience may be of natural growth; though even there we doubt whether it has ever been found among any people with whom fatalism, or in other words, submission to the pressure of circumstances as [v]a divine decree[v], did not prevail as a religious doctrine. But the difficulty of inducing a brave and warlike race to submit their individual *arbitrium* to any common umpire, has always been felt to be so great, that nothing short of supernatural power has been deemed adequate to overcome it; and such tribes have always assigned to the first institution of civil society a divine origin. So differently did those judge who knew savage [w]men[w] by actual experience, from those who had no acquaintance with [x]them[x] except in the civilized state. In modern Europe itself, after the fall of the Roman empire, to subdue the feudal anarchy and bring the whole people of any European nation into subjection to government (though Christianity in [y]the most concentrated form of its influence was co-operating[y] in the work) required thrice as many centuries as have elapsed since that time.

Now if these philosophers had known human nature under any other type than that of their own age, and of the particular classes of society among whom they [z]lived[z], it would have occurred to them, that wherever this habitual submission to law and government has been firmly and durably established, and yet the vigour and manliness of character which resisted its establishment have been in any degree preserved, certain requisites have existed, certain conditions have been fulfilled, of which the following may be regarded as the principal.

First: there has existed, for all who were accounted citizens,—for all who were not slaves, kept down by brute force,—a system of *education*, beginning with infancy and continued through life, of which whatever else it might include, one main and incessant ingredient was *restraining discipline*. To train the human being in the habit, and thence the power, of subordinating his personal impulses and aims, to what were considered the ends of society; of adhering, against all temptation, to the course of conduct which those ends prescribed; of controlling in himself all [a] feelings which were liable to militate against those ends, and encouraging all such as tended towards them; this was the purpose, to which every outward motive that the authority directing the system could command, and every inward power or principle which its knowledge of human nature enabled it

[u-u]MS which sociological statics would consist of

[v-v]Source, MS, 43, 46 the decree of God [*the* Source *readings from* "Coleridge" *do not all appear in every version of that essay; for the full collation see Collected Works*, Vol. X, pp. 504–8]

[w-w]Source, MS man [*printer's error; cf. variant* [x-x] *below*]

[x-x]Source, MS, 43, 46 him

[y-y]Source, MS, 43, 46 its most concentrated form was co-operating with all its influences

[z-z]Source, MS, 43, 46 moved

[a]Source, MS the] 43, 46, 51, 56 those

to evoke, were endeavoured to be rendered instrumental. [b]The entire civil and military policy of the ancient commonwealths was such a system of training; in modern nations its place has been attempted to be supplied, principally, by religious teaching.[b] And whenever and in proportion as the strictness of [c]the restraining[c] discipline was relaxed, the natural tendency of mankind to anarchy re-asserted itself; the state became disorganized from within; mutual conflict for selfish ends, neutralized the energies which were required to keep up the contest against natural causes of evil; and the nation, after a longer or briefer interval of progressive decline, became either the slave of a despotism, or the prey of a foreign invader.

The second condition of permanent political society has been found to be, the existence, in some form or other, of the feeling of allegiance or loyalty. This feeling may vary in its objects, and is not confined to any particular form of government; but whether in a democracy or in a monarchy, its essence is always the same; viz. that there be in the constitution of the state *something* which is settled, something permanent, and not to be called in question; something which, by general agreement, has a right to be where it is, and to be secure against disturbance, whatever else may change. This feeling may attach itself, as among the Jews (and [d] in most of the commonwealths of antiquity), to a common God or gods, the protectors and guardians of their state. Or it may attach itself to certain persons, who are deemed to be, whether by divine appointment, by long prescription, or by the general recognition of their superior capacity and worthiness, the rightful guides and guardians of the rest. Or it may [e]connect itself with laws; with ancient liberties or ordinances. Or, finally, (and this is the only shape in which the feeling is likely to exist hereafter), it may attach itself to the principles of individual freedom and political and social equality, as realized in institutions which as yet exist nowhere, or exist only in a rudimentary state.[e] But in all political societies which have had a durable existence, there has been some fixed point: something which [f]people[f] [g]agreed[g] in holding sacred; which [h], wherever freedom of discussion was a recognised principle, it was of course[h] lawful to contest in theory, but which no one could either fear or hope to see shaken in practice; which, in short (except perhaps during some temporary crisis) was in the common estimation placed [i]beyond[i] discussion. And the necessity of this may easily be made evident. A state never is, nor until mankind are vastly improved, can hope to be, for any long time exempt from internal dissension; for there neither is nor has ever been any state of society in which collisions did not occur between the immediate interests and passions of powerful sections of the people.

[b-b]Source, MS, 43, 46 This system of discipline wrought, in the Grecian states, by the conjunct influences of religion, poetry, and law; among the Romans, by those of religion and law; in modern and Christian countries, mainly by religion, with little of the direct agency, but generally more or less of the indirect support and countenance, of law.

[c-c]Source, MS, 43, 46 this

[d]Source, MS, 43, 46, 51, 56 indeed

[e-e]Source, MS, 43, 46 attach itself to laws; to ancient liberties, or ordinances; to the whole or some part of the political, or even the domestic, institutions of the state.

[f-f]Source, MS, 43, 46 men

[g-g]56, 62, 65 agree [*printer's error?*]

[h-h]Source, MS, 43, 46 it might or might not be

[i-i]Source, MS, 43, 46 above

What, then, enables [j]nations[j] to weather these storms, and pass through turbulent times without any permanent weakening of the [k]securities for peaceable existence[k]? Precisely this—that however important the interests about which men [l]fell out, the conflict did[l] not affect the fundamental [m]principle[m] of the system of social union which [n]happened to exist; nor threaten large portions of the community with the subversion of that on which they had built their calculations, and with which their hopes and aims had[n] become identified. But when the questioning of these fundamental principles is (not [o]the occasional disease, or salutary medicine[o], but) the habitual condition of the body politic, and when all the violent animosities are called forth, which spring naturally from such a situation, the state is virtually in a position of civil war; and can never long remain free from it in act and fact.

The third essential condition [p]of stability in political society, is a strong and active principle of cohesion among the members of the same community or state[p]. We need scarcely say that we do not mean [q]nationality, in the vulgar sense of the term;[q] a senseless antipathy to foreigners; [r] [s]indifference to the general welfare of the human race, or an unjust preference of the supposed interests of our own country;[s] a cherishing of [t]bad[t] peculiarities because they are national, or a refusal to adopt what has been found good by other countries. [u] We mean a principle of sympathy, not of hostility; of union, not of separation. We mean a feeling of common interest among those who live under the same government, and are contained within the same natural or historical boundaries. We mean, that one part of the community [v]do[v] not consider themselves as foreigners with regard to another part; that they [w]set a value on their connexion—[w] feel that they are one people, that their lot is cast together, that evil to any of their fellow-countrymen is evil to themselves, and [x]do not desire selfishly to[x] free themselves from their share of any common inconvenience by severing the connexion. How strong this feeling was in [y]those ancient commonwealths which attained any durable greatness,[y] every one knows. How happily Rome, in spite of all her tyranny, succeeded in establishing the feeling of a common country among the provinces of her vast and divided empire, will appear when any one who has given due attention to the subject shall take the trouble to point it out. In modern times the countries which have had that feeling in the strongest degree have been the most powerful coun-

[j-j]Source, MS, 43, 46 society
[k-k]Source, MS, 43, 46 ties which hold it together
[l-l]Source, MS, 43, 46 fall out, the conflict does
[m-m]Source, MS, 43, 46, 51 principles
[n-n]Source, MS, 43, 46 happens to . . . they have built . . . aims have
[o-o]Source, MS, 43, 46 an occasional disease
[p-p]Source, MS, 43, 46 , which has existed in all durable political societies, is a strong and active principle of nationality
[q-q]+51, 56, 62, 65, 68, 72
[r]Source, 51, 56 an
[s-s]Source, MS, 43, 46 or
[t-t]Source, MS, 43, 46 absurd
[u]Source, MS, 43, 46 In all these senses, the nations which have had the strongest national spirit have had the least nationality.
[v-v]Source, MS, 43, 46 shall
[w-w]Source, MS, 43, 46 shall cherish the tie which holds them together; shall
[x-x]Source, MS, 43, 46 that they cannot selfishly
[y-y]Source, MS, 43, 46 the ancient commonwealths

tries; England, France, and, in proportion to their territory and resources, Holland and Switzerland; while England in her connexion with Ireland, is one of the most signal examples of the consequences of its absence. Every Italian knows why Italy is under a foreign yoke; every German knows what maintains despotism in the Austrian empire;* the [z]evils[z] of Spain flow as much from the absence of nationality among the Spaniards themselves, as from the presence of it in their relations with foreigners: while the completest illustration of all is afforded by the republics of South America, where the parts of one and the same state adhere so slightly together, that no sooner does any province think itself aggrieved by the general government than it proclaims itself a separate nation.[*]

§ 6. [*Social Dynamics, or the science of the Successions of Social Phenomena*] While the derivative laws of social statics are ascertained by analysing different states of society, and comparing them with one another, without regard to the order of their succession; the consideration of the successive order is, on the contrary, predominant in the study of social dynamics, of which the aim is to observe and explain the sequences of social conditions. This branch of the social science would be as complete as it can be made, if every one of the leading general circumstances of each generation were traced to its causes in the generation immediately preceding. But the *consensus* is so complete, (especially in modern history,) that in the filiation of one generation and another, it is the whole which produces the whole, rather than any part a part. Little progress, therefore, can be made in establishing the filiation, directly from laws of human nature, without having first ascertained the immediate or derivative laws according to which social states generate one another as society advances; the *axiomata media* of General Sociology.

The empirical laws which are most readily obtained by generalization from history do not amount to this. They are not the "middle principles" themselves, but only evidence towards the establishment of such principles. They [a]consist[a] of certain general tendencies which may be perceived in society; a progressive increase of some social elements, and diminution of others, or a gradual change in the general character of certain elements. It is easily seen, for instance, that as society advances, mental tend more and more to prevail over bodily qualities, and masses over individuals: that the occupation of all that portion of mankind who are not under external restraint is at first chiefly military, but society becomes progressively more and

*[72] (Written and first published in 1840 [*Westminster Review*, XXXIII (Mar., 1840)].)

[*"Coleridge," *Dissertations and Discussions*, Vol. I, pp. 415–21; *Collected Works*, Vol. X, pp. 132–6, and see headnote to App. D, pp. 503–4.]

[z-z]Source, MS woes
[a-a]MS may be described as consisting

more engrossed with productive pursuits, and the military spirit gradually gives way to the industrial; to which many [b] similar truths might [c] be added. And with generalizations of this description, ordinary inquirers, even of the historical school now predominant on the Continent, are satisfied. But these and all such results are still at too great a distance from the elementary laws of human nature on which they depend,—too many links intervene, and the concurrence of causes at each link is far too complicated,—to enable these propositions to be presented as direct corollaries from those elementary principles [d]. They[d] have, therefore, in the minds of most inquirers, remained in the state of empirical laws, applicable only within the bounds of actual observation; without any means of determining their real limits, and [e]of[e] judging whether the changes which have hitherto been in progress are destined to continue indefinitely, or to terminate, or even to be reversed.

§ 7. [*Outlines of the Historical Method*] In order to obtain better empirical laws, we must not rest satisfied with noting the progressive changes which manifest themselves in the separate elements of society, and in which nothing is indicated but the relation of [a] fragments of the effect to corresponding fragments of the cause. It is necessary to combine the statical view of social phenomena with the dynamical, considering not only the progressive changes of the different elements, but the contemporaneous condition of each; and thus obtain empirically the law of correspondence not only between the simultaneous states, but between the simultaneous changes, of those elements. This law of correspondence it is, which, [b]duly verified *à priori*, would[b] become the real scientific derivative law of the development of humanity and human affairs.

In the difficult process of observation and comparison which is here required, it would evidently be a [c] great assistance if it should happen to be the fact, that some one element in the complex existence of social man is pre-eminent over all others as the prime agent of the social movement. For we could then take the progress of that one element as the central chain, to each successive link of which, the corresponding links of all the other progressions being appended, the succession of the facts would by this alone be presented in a kind of spontaneous order, far more nearly approaching to the real order of their filiation than could be obtained by any other merely empirical process.

[b]MS, 43 other
[c]MS, 43, 46 easily
[d-d]MS , & they
[e-e]+43, 46, 51, 56, 62, 65, 68, 72
[a]MS, 43 the
[b-b]MS, 43, 46 after being duly verified *à priori*, will
[c]MS, 43, 46 very

Now, the evidence of history and [d]that[d] of human nature combine, by a [e] striking instance of consilience, to show that there really is one social element which is thus predominant, and almost paramount, among the agents of the social progression. This is, the state of the speculative faculties of mankind; [f]including[f] the nature of the [g] beliefs which by any means they have arrived at, concerning themselves and the world by which they are surrounded.

It would be a great error, and one very little likely to be committed, to assert that speculation, intellectual activity, the pursuit of truth, is among the more powerful propensities of human nature, or [h]holds a predominating[h] place in the lives of any, save decidedly exceptional, individuals. But, notwithstanding the relative weakness of this principle among other sociological agents, its influence is the main determining cause of the social progress; all the other dispositions of our nature which contribute to that progress, being dependent on it for the means of accomplishing their share of the work. Thus (to take the most obvious case first,) the impelling force to most of the improvements effected in the arts of life, is the desire of increased material comfort; but as we can only act upon external objects in proportion to our knowledge of them, the state of knowledge at any time is the [i] limit of the industrial improvements possible at that time; and the progress of industry must follow, and depend on, the progress of knowledge. The same thing may be shown to be true, though it is not quite so obvious, of the progress of the fine arts. Further, as the strongest propensities of [j]uncultivated or half-cultivated[j] human nature (being the purely selfish ones, and those of a sympathetic character which partake most of the nature of selfishness) evidently tend in themselves to disunite mankind, not to unite them,—to make them rivals, not confederates; social existence is only possible by a disciplining of those more powerful propensities, which consists in subordinating them to a common system of opinions. The degree of this subordination is the measure of the completeness of the social union, and the nature of the common opinions determines its kind. But in order that mankind should conform their actions to any set of opinions, [k]these[k] opinions must exist, must be believed by them. And [l]thus, the state of the speculative faculties, the character of the propositions assented to by the intellect,[l] essentially determines the moral and political state of the community, as we have already seen that it determines the physical.

These conclusions, deduced from the laws of human nature, are in entire accordance with the general facts of history. Every considerable change

[d-d]MS, 43, 46 the evidence
[e]MS, 43, 46 most
[f-f]MS &
[g]MS, 43, 46 speculative
[h-h]MS, 43, 46 fills a large
[i]MS, 43, 46 impassable
[j-j]+51, 56, 62, 65, 68, 72
[k-k]MS those [*printer's error?*]
[l-l]MS thus it is the state . . . intellect, which

historically known to us in the condition of any portion of mankind, [m]when not brought about by external force,[m] has been preceded by a change, of proportional extent, in the state of their knowledge, or in their prevalent beliefs. As between any given state of speculation, and the correlative state of everything else, it was almost always the former which first showed itself; though the effects, no doubt, reacted potently upon the cause. Every considerable advance in material civilization has been preceded by an advance in knowledge: and when any great social change has come to pass, [n]either in the way of gradual development or of sudden conflict, it has had for its precursor a great change in the opinions and modes of thinking of society[n]. Polytheism, Judaism, Christianity, Protestantism, the [o]critical[o] philosophy of modern Europe, and its positive science—each of these has been a primary agent in making society what it was at each successive period, while society was but secondarily instrumental in making *them*, each of [p]them (so far as causes can be assigned for its existence) being[p] mainly an emanation not from the practical life of the period, but from the [q]previous state of belief and thought[q]. The weakness of the speculative propensity [r]in mankind generally,[r] has not, therefore, prevented the progress of speculation from governing that of society at large; it has only, and too often, prevented progress altogether, where the intellectual progression has come to an early stand for want of sufficiently favourable circumstances.

From this accumulated evidence, we are justified in concluding, that the order of human progression in all respects will [s]mainly depend on the order of progression in the intellectual convictions of mankind, that is, on[s] the law of the successive transformations of [t]human opinions[t]. The question remains, whether this law can be determined; at first from history as an empirical law, then converted into a scientific theorem by deducing it *à priori* from the principles of human nature. As the progress of knowledge and the changes in the opinions of mankind are very slow, and manifest themselves in a well-defined manner only at long intervals; it cannot be expected that the general order of sequence should be discoverable from the examination of less than a very considerable part of the duration of the social progress. It is necessary to take into consideration the whole of past time, from the first recorded

[m-m]+46, 51, 56, 62, 65, 68, 72
[n-n]MS, 43, 46 a great change in the opinions and modes of thinking of society had taken place shortly before
[o-o]MS, 43, 46 negative
[p-p]MS them so . . . for it being
[q-q]MS, 43, 46 state of belief and thought during some time previous
[r-r]+51, 56, 62, 65, 68, 72
[s-s]MS, 43, 46 be a corollary deducible from the order . . . is, from
[t-t]MS, 43, 46 religion and science

condition of the human race [u], to the memorable phenomena of the last and present generations[u].

§ 8. [*Further prospects of Sociological Inquiry*] The investigation which I have thus endeavoured to characterize, has been systematically attempted, up to the present time, by M. Comte alone. [a]His work is hitherto the only known example of the study of social phenomena according to this conception of the Historical Method. Without discussing here the worth of his conclusions, and especially of his predictions and recommendations with respect to the Future of society, which appear to me greatly inferior in value to his appreciation of the Past, I shall confine myself to mentioning one important generalization, which M. Comte[a] regards as the fundamental law of the progress of human knowledge. Speculation he conceives to have, on every subject of human inquiry, three successive stages; in the first of which it tends to explain the phenomena by supernatural agencies, in the second by metaphysical abstractions, and in the third or final state confines itself to ascertaining their laws of succession and similitude. This generalization appears to me to have that high degree of scientific evidence, which is derived from the concurrence of the indications of history with the probabilities derived from the constitution of the human mind. Nor could it be easily conceived, from the mere enunciation of such a proposition, what a flood of light it lets in upon the whole course of history; when its consequences are traced, by connecting with each of the three states of human intellect which it distinguishes, and with each successive modification of those three states, the [b]correlative condition of[b] [c] other social phenomena.*

*[62] This great generalization is often unfavourably criticised (as by Dr. Whewell for instance) under a misapprehension of its real import. The doctrine,

[u-u]MS, 43, 46 ; and it is probable that all the terms of the series already past were indispensable to the operation; that the memorable phenomena of the last generation, and even those of the present, were necessary to manifest the law, and that consequently the Science of History has only become possible in our own time

[a-a]MS, 43 It is not here that a critical examination can be undertaken of the results of his labours; which besides are as yet, comparatively speaking, only in their commencement. But his works are the only source to which the reader can resort for practical exemplification of the study of social phenomena on the true principles of the Historical Method. Of that method I do not hesitate to pronounce them a model: what is the value of his conclusions is another question, and one on which this is not the place to decide.

I cannot, however, omit to mention one important generalization, which he] 46 His works are hitherto the only known example of the study . . . *as* MS] 51 *as* 72 . . . Historical Method. What is the value . . . *as* MS . . . and one on which something will be said further on.

I cannot . . . *as* MS

[b-b]MS condition of which on the principles of Sociological Statics, is naturally correlative with it, [*incomplete rewriting*]

[c]MS, 43, 46 all

But whatever decision competent judges may pronounce on the results arrived at by any individual inquirer, the method [d]now characterized is that by which the derivative laws of social order and of social progress must be sought. By its aid[d] we may hereafter succeed not only in looking far forward into the future history of the human race, but in determining what artificial means may be used, and to what extent, to accelerate the natural progress in so far as it is beneficial; to compensate for whatever may be its inherent in-

that the theological explanation of phenomena belongs only to the infancy of our knowledge of them, ought not to be construed as if it was equivalent to the assertion, that mankind, as their knowledge advances, will necessarily cease to believe in any kind of theology. This was M. Comte's opinion; but it is by no means implied in his fundamental theorem. All that is implied is, that in an advanced state of human knowledge, no other Ruler of the World will be acknowledged than one who rules by universal laws, and does not at all, or does not unless in very peculiar cases, produce events by special interpositions. Originally all natural events were ascribed to such interpositions. At present every educated person rejects this explanation in regard to all classes of phenomena of which the laws have been fully ascertained; though some have not yet reached the point of referring all phenomena to the idea of Law, but believe that rain and sunshine, famine and pestilence, victory and defeat, death and life, are issues which the Creator does not leave to the operation of his general laws, but reserves to be decided by express acts of volition. M. Comte's theory is the negation of this doctrine.

Dr. Whewell equally misunderstands M. Comte's doctrine respecting the second or metaphysical stage of speculation. M. Comte did not mean that "discussions concerning ideas" are limited to an early stage of inquiry, and cease when science enters into the positive stage. (*Philosophy of Discovery*, pp. 226 et seq.) In all M. Comte's speculations as much stress is laid on the process of clearing up our conceptions, as on the ascertainment of facts. When M. Comte speaks of the metaphysical stage of speculation, he means the stage in which men speak of "Nature" and other abstractions as if they were active forces, producing effects; when Nature is said to do this, or forbid that; when Nature's horror of a vacuum, Nature's non-admission of a break, Nature's *vis medicatrix*, were offered as explanations of phenomena; when the qualities of things were mistaken for real entities dwelling in the things; when the phenomena of living bodies were thought to be accounted for by being referred to a "vital force;" when, in short, the abstract names of phenomena were mistaken for the causes of their existence. In this sense of the word it cannot be reasonably denied that the metaphysical explanation of phenomena, equally with the theological, gives way before the advance of real science.

That the final, or positive stage, as conceived by M. Comte, has been equally misunderstood, and that, notwithstanding some expressions open to just criticism, M. Comte never dreamed of denying the legitimacy of inquiry into all causes which are accessible to human investigation, I have pointed out in a former place [pp. 341–2].

[d-d]MS, 43, 46 has been found by which an indefinite number of the derivative laws both of social order and of social progress may in time be ascertained. By the aid of these,

conveniences or disadvantages; and to guard against the dangers or accidents to which our species is exposed from the necessary incidents of its progression. Such practical instructions, founded on the highest branch of speculative sociology, will form the noblest and most beneficial portion of the Political Art.

That of this science and art even the foundations are but beginning to be laid, is sufficiently evident. But the [e]superior minds[e] are fairly turning themselves towards that object [f]. It[f] has become the aim of [g]really[g] scientific thinkers to connect by theories the facts of universal history: [h]it is acknowledged to be one of the requisites of a general system of social doctrine, that it should explain, so far as the data exist, the main facts of history; and a Philosophy of History is [i]generally admitted[i] to be[h] at once the verification, and the initial form, of the Philosophy of the Progress of Society.

If the endeavours now making in all the more cultivated nations, and beginning to be made even in England ([j]usually the last to enter into the general movement of the European mind[j]) for the construction of a Philosophy of History, shall be directed and controlled by those views of the nature of sociological evidence which I have [k](very briefly and imperfectly) attempted to characterize[k]; they cannot fail to give birth to a sociological system widely removed from the vague and conjectural character of all former attempts, and worthy to take its place, at last, among [l]the[l] sciences. When this time shall come, no important branch of human affairs will be any longer abandoned to empiricism and unscientific surmise: the circle of human knowledge will be complete, and it can only thereafter receive further enlargement by perpetual expansion from within.

[e-e]MS, 43 most powerful and accomplished minds of the present age

[f-f]MS, 43 , and it is the point towards which the speculative tendencies of mankind have now for some time been converging. For the first time, it] 46 ; it is the . . . *as* MS

[g-g]MS, 43 the greatest

[h-h]MS, 43, 46 for the first time it is acknowledged, that no social doctrine is of any value unless it can explain the whole and every part of history, so far as the data exist; and that a Philosophy of History is

[i-i]51, 56 deemed

[j-j]MS, 43, 46 generally the last to adopt whatever does not originate with herself

[k-k]MS attempted to state, but which hitherto have to my knowledge been exemplified nowhere but in the writings of M. Comte] 43 *as* MS . . . hitherto are to my knowledge exemplified . . . *as* MS

[l-l]MS, 43, 46 established

CHAPTER XI

[a]Additional Elucidations of the Science of History

§ 1. [*The subjection of historical facts to uniform laws is verified by statistics*] The doctrine which the preceding chapters were intended to enforce and elucidate—that the collective series of social phenomena, in other words the course of history, is subject to general laws, which philosophy may possibly detect—has been familiar for generations to the scientific thinkers of the Continent, and has for the last quarter of a century passed out of their peculiar domain, into that of newspapers and ordinary political discussion. In our own country, however, at the time of the first publication of this Treatise, it was almost a novelty, and the prevailing habits of thought on historical subjects were the very reverse of a preparation for it. Since then a great change has taken place, and has been eminently promoted by the important work of Mr. Buckle;[*] who, with characteristic energy, [b] flung down this great principle, together with many striking exemplifications of it, into the arena of popular discussion, to be fought over by a sort of combatants, in the presence of a sort of spectators, who would never even have been aware that there existed such a principle if they had been left to learn its existence from the speculations of pure science. And hence has arisen a considerable amount of controversy, tending not only to make the principle rapidly familiar to the majority of cultivated minds, but also to clear it from the confusions and misunderstandings by which it was but natural that it should for a time be clouded, and which impair the worth of the doctrine to those who accept it, and are the stumbling-block of many who do not.

Among the impediments to the general acknowledgment, by thoughtful minds, of the subjection of historical facts to scientific laws, the most fundamental continues to be that which is grounded on the doctrine of Free Will, or in other words, on the denial that the law of invariable Causation holds true of human volitions: for if it does not, the course of history, being the

[*Henry Thomas Buckle. *History of Civilization in England*. 2 vols. London: Parker, 1857, 1861.]

a–a042+62, 65, 68, 72 b62 has

result of human volitions, cannot be a subject of scientific laws, since the volitions on which it depends can neither be foreseen, nor reduced to any canon of regularity even after they have occurred. I have discussed this question, as far as seemed suitable to the occasion, in a former chapter:[*] and I only think it necessary to repeat, that the doctrine of the Causation of human actions, improperly called the doctrine of Necessity, affirms no mysterious *nexus*, or overruling fatality: it asserts only that men's actions are the joint result of the general laws and circumstances of human nature, and of their own particular characters; those characters again being the consequence of the natural and artificial circumstances that constituted their education, among which circumstances must be reckoned their own conscious efforts. Any one who is willing to take (if the expression may be permitted) the trouble of thinking himself into the doctrine as thus stated, will find it, I believe, not only a faithful interpretation of the universal experience of human conduct, but a correct representation of the mode in which he himself, in every particular case, spontaneously interprets his own experience of that conduct.

But if this principle is true of individual man, it must be true of collective man. If it is the law of human life, the law must be realized in history. The experience of human affairs when looked at *en masse*, must be in accordance with it if true, or repugnant to it if false. The support which this *à posteriori* verification affords to the law, is the part of the case which has been most clearly and triumphantly brought out by Mr. Buckle.

The facts of statistics, since they have been made a subject of careful recordation and study, have yielded conclusions, some of which have been very startling to persons not accustomed to regard moral actions as subject to uniform laws. The very events which in their own nature appear most capricious and uncertain, and which in any individual case no attainable degree of knowledge would enable us to foresee, occur, when considerable numbers are taken into the account, with a degree of regularity approaching to mathematical. What act is there which all would consider as more completely dependent on individual character, and on the exercise of individual free will, than that of slaying a fellow creature? Yet in any large country, the number of murders, in proportion to the population, varies (it has been found) very little from one year to another, and in its variations never deviates widely from a certain average. What is still more remarkable, there is a similar approach to constancy in the proportion of these murders annually committed with every particular kind of instrument. There is a like approximation to identity, as between one year and another, in the comparative number of legitimate and of illegitimate births. The same thing is found

[*See above, Bk. VI, Chap. ii, pp. 836ff.]

true of suicides, accidents, and all other social phenomena of which the registration is sufficiently perfect; one of the most curiously illustrative examples being the fact, ascertained by the registers of the London and Paris post-offices, that the number of letters posted which the writers have forgotten to direct, is nearly the same, in proportion to the whole number of letters posted, in one year as in another. "Year after year," says Mr. Buckle, "the same proportion of letter-writers forget this simple act; so that for each successive period we can actually foretell the number of persons whose memory will fail them in regard to this trifling, and as it might appear, accidental occurrence."*

This singular degree of regularity *en masse*, combined with the extreme of irregularity in the cases composing the mass, is a felicitous verification *à posteriori* of the law of causation in its application to human conduct. Assuming the truth of [c]that[c] law, every human action, every murder for instance, is the concurrent result of two sets of causes. On the one part, the general circumstances of the country and its inhabitants; the moral, educational, economical, and other influences operating on the whole people, and constituting what we term the state of civilization. On the other part, the great variety of influences special to the individual: his temperament, and other peculiarities of organization, his parentage, habitual associates, temptations, and so forth. If we now take the whole of the instances which occur within a sufficiently large field to exhaust all the combinations of these special influences, or in other words, to eliminate chance; and if all these instances have occurred within such narrow limits of time, that no material change can have taken place in the general influences constituting the state of civilization of the country; we may be certain, that if human actions are governed by invariable laws, the aggregate result will be something like a constant quantity. The number of murders committed within that space and time, being the effect partly of general causes which have not varied, and partly of partial causes the whole round of whose variations has been included, will be, practically speaking, invariable.

Literally and mathematically invariable it is not, and could not be expected to be: because the period of a year is too short to include *all* the possible combinations of partial causes, while it is, at the same time, sufficiently long to make it probable that in some years at least, of every series, there will have been introduced new influences of a more or less general character; such as a more vigorous or a more relaxed police; some temporary excitement from political or religious causes; or some incident generally notorious, of a nature to act morbidly on the imagination. That in spite of these un-

*Buckle's *History of Civilization*, Vol. I, p. 30.

[c-c]62 the

avoidable imperfections in the data, there should be so very trifling a margin of variation in the annual results, is a brilliant confirmation of the general theory.

§ 2. *[The subjection of historical facts to uniform laws does not imply the insignificance of moral causes]* The same considerations which thus strikingly corroborate the evidence of the doctrine, that historical facts are the invariable effects of causes, tend equally to clear that doctrine from various misapprehensions, the existence of which has been put in evidence by the recent discussions. Some persons, for instance, seemingly imagine the doctrine to imply, not merely that the total number of murders committed in a given space and time, is entirely the effect of the general circumstances of society, but that every particular murder is so too: that the individual murderer is, so to speak, a mere instrument in the hands of general causes; that he himself has no option, or if he has, and chose to exercise it, some one else would be necessitated to take his place: that if any one of the actual murderers had abstained from the crime, some person who would otherwise have remained innocent, would have committed an extra murder to make up the average. Such a corollary would certainly convict any theory which necessarily led to it of absurdity. It is obvious, however, that each particular murder depends, not on the general state of society only, but on that combined with causes special to the case, which are generally much more powerful: and if these special causes, which have greater influence than the general ones in causing every particular murder, have no influence on the number of murders in a given period, it is because the field of observation is so extensive as to include all possible combinations of the special causes—all varieties of individual character and individual temptation compatible with the general state of society. The collective experiment, as it may be termed, exactly separates the effect of the general from that of the special causes, and shows the net result of the former: but it declares nothing at all respecting the amount of influence of the special causes, be it greater or smaller, since the scale of the experiment extends to the number of cases within which the effects of the special causes balance one another, and disappear in that of the general causes.

I will not pretend that all the defenders of the theory have always kept their language free from this same confusion, and have shown no tendency to exalt the influence of general causes at the expense of special. I am of opinion, on the contrary, that they have done so in a very great degree, and by so doing have encumbered their theory with difficulties, and laid it open to objections, which do not necessarily affect it. Some, for example [a](among whom is Mr. Buckle himself)[a], have inferred, or allowed it to be supposed

[a-a]+65, 68, 72

that they inferred, from the regularity in the recurrence of events which depend on moral qualities, that the moral qualities of mankind are little capable of being improved, or are of little importance in the general progress of society, compared with intellectual or economic causes. But to draw this inference [b]is[b] to forget that the statistical tables, from which the invariable averages are deduced, were compiled from facts occurring within narrow geographical limits and in a small number of successive years; that is, from a field the whole of which was under the operation of the same general causes, and during too short a time to allow of much change therein. All moral causes but those common to the country generally, have been eliminated by the great number of instances taken; and those which are common to the whole country have not varied considerably, in the short space of time comprised in the observations. If we admit the supposition that they have varied; if we compare one age with another, or one country with another, or even one part of a country with another, differing in position and character as to the moral elements, the crimes committed within a year give no longer the same, but a widely different numerical aggregate. And this cannot but be the case: for inasmuch as every single crime committed by an individual mainly depends on his moral qualities, the crimes committed by the entire population of the country must depend in an equal degree on their collective moral qualities. To render this element inoperative upon the large scale, it would be necessary to suppose that the general moral average of mankind does not vary from country to country or from age to age; which is not true, and even if it were true, could not possibly be proved by any existing statistics. I do not on this account the less agree in the opinion of Mr. Buckle, that the intellectual element in mankind, including in that expression the nature of their beliefs, the amount of their knowledge, and the development of their intelligence, is the predominant circumstance in determining their progress. But I am of this opinion, not because I regard their moral or [c] economical condition either as less powerful or less variable agencies, but because these are in a great degree the consequences of the intellectual condition, and are, in all cases, limited by it; as was observed in the preceding chapter. The intellectual changes are [d]the most conspicuous agents[d] in history, not from their superior force, considered in themselves, but because practically they work with the united power belonging to all three.*

*[68] I have been assured by an intimate friend of Mr. Buckle that he would not have withheld his assent from these remarks, and that he never intended to affirm or imply that mankind are not progressive in their moral as well as in their intellectual qualities. "In dealing with his problem, he availed himself of the artifice resorted to by the Political Economist, who leaves out of consideration the

[b-b]62 would be [c]62 their
[d-d]62, 65 so much the most conspicuous agency

§ 3. [*The subjection of historical facts to uniform laws also does not imply the inefficacy of the characters of individuals and of the acts of government*] There is another distinction often neglected in the discussion of this subject, [a] which it is extremely important to observe. The theory of the subjection of social progress to invariable laws, is often held in conjunction with the doctrine, that social progress cannot be materially influenced by the exertions of individual persons, or by the acts of governments. But though these opinions are often held by the same persons, they are two very different opinions, and the confusion between them is the eternally recurring error of confounding Causation with Fatalism. Because whatever happens will be the effect of causes, human volitions among the rest, it does not follow that volitions, even those of peculiar individuals, are not of great efficacy as causes. If any one in a storm at sea, because about the same number of persons in every year perish by shipwreck, should conclude that it was useless for him to attempt to save his own life, we should call him a Fatalist; and should remind him that the efforts of shipwrecked persons to save their lives are so far from being immaterial, that the average amount of those efforts is one of the causes on which the ascertained annual number of deaths by shipwreck [b]depend[b]. However universal the laws of social development may be, they cannot be more universal or more rigorous than those of the physical agencies of nature; yet human will can convert these into instruments of its designs, and the extent to which it does so makes the chief difference between savages and the most highly civilized people. Human and social facts, from their more complicated nature, are not less, but more, modifiable, than

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generous and benevolent sentiments, and founds his science on the proposition that mankind are actuated by acquisitive propensities alone," not because such is the fact, but because it is necessary to begin by treating the principal influence as if it was the sole one, and make the due corrections afterwards. "He desired to make abstraction of the intellect as the determining and dynamical element of the progression, eliminating the more dependent set of conditions, and treating the more active one as if it were an entirely independent variable."

The same friend of Mr. Buckle states that when he used expressions which seemed to exaggerate the influence of general at the expense of special causes, and especially at the expense of the influence of individual minds, Mr. Buckle really intended no more than to affirm emphatically that the greatest men cannot effect great changes in human affairs unless the general mind has been in some considerable degree prepared for them by the general circumstances of the age; a truth which, of course, no one thinks of denying. And there certainly are passages in Mr. Buckle's writings which speak of the influence exercised by great individual intellects in as strong terms as could be desired. [George Capel, letter to Mill, 3 November, 1866, British Library of Political and Economic Science (London School of Economics), Mill-Taylor Collection, Vol. I, item 98.]

[a]62, 65 and
[b-b]62, 65 depends

mechanical and chemical facts; human agency, therefore, has still greater power over them. And accordingly, those who maintain that the evolution of society depends exclusively, or almost exclusively, on general causes, always include among these the collective knowledge and intellectual development of the race. But if of the race, why not also of some powerful monarch or thinker, or [c]of[c] the ruling portion of some political society, acting through its government? Though the varieties of character among ordinary individuals neutralize one another on any large scale, exceptional individuals in important positions do not in any given age neutralize one another; there was not another Themistocles, or Luther, or Julius Cæsar, of equal powers and contrary dispositions, who exactly balanced the given Themistocles, Luther, and Cæsar, and prevented them from having any permanent effect. Moreover, for aught that appears, the volitions of exceptional persons, or the opinions and purposes of the individuals who at some particular time compose a government, may be indispensable links in the chain of causation by which even the general causes produce their effects; and I believe this to be the only tenable form of the theory.

Lord Macaulay, in a celebrated passage of one of his early essays (let me add that it was one which he did not himself choose to reprint), gives expression to the doctrine of the absolute inoperativeness of great men, more unqualified, I should think, than has been given to it by any writer of equal abilities. He compares them to persons who merely stand on a loftier height, and thence receive the sun's rays a little earlier, than the rest of the human race. "The sun illuminates the hills while it is still below the horizon, and truth is discovered by the highest minds a little before it becomes manifest to the multitude. This is the extent of their superiority. They are the first to catch and reflect a light which, without their assistance, must in a short time be visible to those who lie far beneath them."* If this metaphor is to be carried out, it follows that if there had been no Newton, the world would not only have had the Newtonian system, but would have had it equally soon; as the sun would have risen just as early to spectators in the plain if there had been no mountain at hand to catch still earlier rays. And so it would be, if truths, like the sun, rose by their own proper motion, without human effort; but not otherwise. I believe that if Newton had not lived, the world must have waited for the Newtonian philosophy until there had been another Newton, or his equivalent. No ordinary man, and no succession of ordinary men, could have achieved it. I will not go the length of saying that what Newton did in a single life, might not have been done in successive steps by some of those

*Essay on Dryden, in *Miscellaneous Writings* [2 vols. London: Longman, 1860], Vol. I, p. 186.

[c-c]+68, 72

who followed him, each singly inferior to him in genius. But even the least of those steps required a man of great intellectual superiority. Eminent men do not merely see the coming light from the hill-top, they mount on the hill-top and evoke it; and if no one had ever ascended thither, the light, in many cases, might never have risen upon the plain at all. Philosophy and religion are abundantly amenable to general causes; yet few will doubt, that had there been no Socrates, no Plato, and no Aristotle, there would have been no philosophy for the next two thousand years, nor in all probability then; and that if there had been no Christ, and no St. Paul, there would have been no Christianity.

The point in which, above all, the influence of remarkable individuals is decisive, is in determining the celerity of the movement. In most states of society it is the existence of great men which decides even whether there shall be any progress. It is conceivable that Greece, or that Christian Europe, might have been progressive in certain periods of their history through general causes only: but if there had been no Mahomet, would Arabia have produced Avicenna or Averroes, or Caliphs of Bagdad or of Cordova? In determining, however, in what manner and order the progress of mankind shall take place if it take place at all, much less depends on the character of individuals. There is a sort of necessity established in this respect by the general laws of human nature; by the constitution of the human mind. Certain truths cannot be discovered, or inventions made, unless certain others have been made first; certain social improvements, from the nature of the case, can only follow, and not precede, others. The order of human progress, therefore, may to a certain extent have definite laws assigned to it: while as to its celerity, or even as to its taking place at all, no generalization, extending to the human species generally, can possibly be made; but only some very precarious approximate generalizations, confined to the small portion of mankind in whom there has been anything like consecutive progress within the historical period, and deduced from their special position, or collected from their particular history. Even looking to the *manner* of progress, the order of succession of social states, there is need of great flexibility in our generalizations. The limits of variation in the possible development of social, as of animal life, are a subject of which little is yet understood, and are one of the great problems in social science. It is, at all events, a fact, that different portions of mankind, under the influence of different circumstances, have developed themselves in a more or less different manner and into different forms; and among these determining circumstances, the individual character of their great speculative thinkers or practical organizers may well have been one. Who can tell how profoundly the whole subsequent history of China may have been influenced by the individuality of Confucius? and of Sparta (and hence of Greece and the world) by that of Lycurgus?

Concerning the nature and extent of what a great man under favourable circumstances can do for mankind, as well as of what a government can do for a nation, many different opinions are possible; and every shade of opinion on these points is consistent with the fullest recognition that there are invariable laws of historical phenomena. Of course the degree of influence which has to be assigned to these more special agencies, makes a great difference in the precision which can be given to the general laws, and in the confidence with which predictions can be grounded on them. Whatever depends on the peculiarities of individuals, combined with the accident of the positions they hold, is necessarily incapable of being foreseen. Undoubtedly these casual combinations might be eliminated like any others, by taking a sufficiently large cycle: the peculiarities of a great historical character make their influence felt in history sometimes for several thousand years, but it is highly probable that they [d]will[d] make no difference at all at the end of fifty millions. Since, however, we cannot obtain an average of the vast length of time necessary to exhaust all the possible combinations of great men and circumstances, as much of the law of evolution of human affairs as depends upon this average, is and remains inaccessible to us: and within the next thousand years, which are of considerably more importance to us than the whole remainder of the fifty millions, the favourable and unfavourable combinations which will occur will be to us purely accidental. We cannot foresee the advent of great men. Those who introduce new speculative thoughts or great practical conceptions into the world, cannot have their epoch fixed beforehand. What science can do, is this. It can trace through past history the general causes which had brought mankind into that preliminary state, which when the right sort of great man appeared, rendered them accessible to his influence. If this state continues, experience renders it tolerably certain that in a longer or shorter period the great man will be produced; provided that the general circumstances of the country and people are (which very often they are not) compatible with his existence; of which point also, science can in some measure judge. It is in this manner that the results of progress, except as to the celerity of their production, can be, to a certain extent, reduced to regularity and law. And the belief that they can be so, is equally consistent with assigning very great, or very little efficacy, to the influence of exceptional men, or of the acts of governments. And the same may be said of all other accidents and disturbing causes.

§ 4. [*The historical importance of eminent men and of the policy of governments illustrated*] It would nevertheless be a great error to assign only a trifling importance to the agency of eminent individuals, or of governments. It must not be concluded that the influence of either is small, because they

[d-d]62, 65, 68 may

cannot bestow what the general circumstances of society, and the course of its previous history, have not prepared it to receive. Neither thinkers nor governments effect all that they intend, but in compensation they often produce important results which they did not in the least foresee. Great men, and great actions, are seldom wasted: they send forth a thousand unseen influences, more effective than those which are seen; and though nine out of every ten things done, with a good purpose, by those who are in advance of their age, produce no material effect, the tenth thing produces effects twenty times as great as any one would have dreamed of predicting from it. Even the men who for want of sufficiently favourable circumstances left no impress at all upon their own age, have often been of the greatest value to posterity. Who could appear to have lived more entirely in vain, than some of the early heretics? They were burnt or massacred, their writings extirpated, their memory anathematized, and their very names and existence left for seven or eight centuries in the obscurity of musty manuscripts—their history to be gathered, perhaps, only from the sentences by which they were condemned. Yet the memory of these men—men who resisted certain pretensions or certain dogmas of the Church in the very age in which the unanimous assent of Christendom was [a]afterwards[a] claimed as having been given to them, and asserted as the ground of their authority—broke the chain of tradition, established a series of precedents for resistance, inspired later Reformers with the courage, and armed them with the weapons, which they needed when mankind were better prepared to follow their impulse. To this example from men, let us add another from governments. The comparatively enlightened rule of which Spain had the benefit during a considerable part of the eighteenth century, did not correct the fundamental defects of the Spanish people; and in consequence, though it did great temporary good, so much of that good perished with it, that it may plausibly be affirmed to have had no permanent effect. The case has been cited as a proof how little governments can do in opposition to the causes which have determined the general character of the nation. It does show how much there is which they cannot do; but not that they can do nothing. Compare what Spain was at the beginning of that half century of liberal government, with what she had become at its close. That period fairly let in the light of European thought upon the more educated classes; and it never afterwards ceased to go on spreading. Previous to that time the change was in an inverse direction; culture, light, intellectual and even material activity, were becoming extinguished. Was it nothing to arrest this downward and convert it into an upward course? How much that Charles the Third and Aranda could not do, has been the ultimate consequence of what they did! To that half century Spain owes that she has got rid of the Inquisition, that she has got rid of the monks, that she now has

[a-a]+68, 72

parliaments and [b](save in exceptional intervals)[b] a free press, and the feelings of freedom and citizenship, and is acquiring railroads and all the other constituents of material and economical progress. In the Spain which preceded that era, there was not a single element at work which could have led to these results in any length of time, if the country had continued to be governed as it was by the last princes of the Austrian dynasty, or if the Bourbon rulers had been from the first what, both in Spain and in Naples, they afterwards became.

And if a government can do much, even when it seems to have done little, in causing positive improvement, still greater are the issues dependent on it in the way of warding off evils, both internal and external, which else would stop improvement altogether. A good or a bad counsellor, in a single city at a particular crisis, has affected the whole subsequent fate of the world. It is as certain as any contingent judgment respecting historical events can be, that if there had been no Themistocles there would have been no victory of Salamis; and had there not, where would have been all our civilization? How different again would have been the issue if Epaminondas, or Timoleon, or even Iphicrates, instead of Chares and Lysicles, had commanded at Chæroneia. As is well said in the second of two Essays on the Study of History,* in my judgment the soundest and most philosophical productions which the [c]recent controversies on this subject have[c] called forth; historical science authorizes not absolute, but only conditional predictions. General causes count for much, but individuals also "produce great changes in history, and colour its whole complexion long after their death. . . . No one can doubt that the Roman republic would have subsided into a military despotism if Julius Cæsar had never lived;" (thus much was rendered practically certain by general causes): "but is it at all clear that in that case Gaul would ever have formed a province of the empire? Might not Varus have lost his three legions on the banks of the Rhone? and might not that river have become the frontier instead of the Rhine? This might well have happened if Cæsar and Crassus had changed provinces; and it is surely impossible to say that in such an event the venue (as lawyers say) of European civilization might not have been changed. The Norman Conquest in the same way was as much the act of a single man, as the writing of a newspaper article; and knowing as we do the history of that man and his family, we can retrospectively predict with all but infallible certainty, that no other person" (no other in that age, I presume, is meant), "could have accomplished the enterprise. If it had not been

*[62] In the *Cornhill Magazine* for June and July, 1861. [James Fitzjames Stephen. "The Study of History," *Cornhill*, III (June, 1861), pp. 666–80; IV (July, 1861), pp. 25–41.]

[b–b]+68, 72
[c–c]62, 65 present controversy on this subject has

accomplished, is there any ground to suppose that either our history or our national character would have been what they are?"[*]

As is most truly remarked by the same writer, the whole stream of Grecian history, as cleared up by Mr. Grote,[†] is one series of examples how often events on which the whole destiny of subsequent civilization turned, were dependent on the personal character for good or evil of some one individual. It must be said, however, that Greece furnishes the most extreme example of this nature to be found in history, and is a very exaggerated specimen of the general tendency. It has happened only that once, and will probably never happen again, that the fortunes of mankind depended upon keeping a certain order of things in existence in a single town, or a country scarcely larger than Yorkshire; capable of being ruined or saved by a hundred causes, of very slight magnitude in comparison with the general tendencies of human affairs. Neither ordinary accidents, nor the characters of individuals, can ever again be so vitally important as they then were. The longer our species lasts, and the more civilized it becomes, the more, as Comte remarks,[‡] does the influence of past generations over the present, and of mankind *en masse* over every individual in it, predominate over other forces: and though the course of affairs never ceases to be susceptible of alteration both by accidents and by personal qualities, the increasing preponderance of the collective agency of the species over all minor causes, is constantly bringing the general evolution of the race into something which deviates less from a certain and preappointed track. Historical science, therefore, is always becoming more possible: not solely because it is better studied, but because, in every generation, it becomes better adapted for study.[a]

[*IV (July, 1861), pp. 58, 57–8.]
[†George Grote. *A History of Greece*. 12 vols. London: Murray, 1846–56.]
[‡See, e.g., *Cours*, Vol. IV, p. 451.]

Bain says Grote integrated this "Logic of Practice" to 2nd ed ; ... Bain, Minor Works, [119].

[a]CHAPTER XII[a]

Of the Logic of Practice, or Art; Including Morality and Policy

§ 1. [*Morality not a Science, but an Art*] In the preceding chapters we have endeavoured to characterize the present state of those among the branches of knowledge called Moral, which are sciences in the only proper sense of the term, that is, inquiries into the course of nature. It is customary, however, to include under the term moral knowledge, and even (though improperly) under that of moral science, an inquiry the results of which do not express themselves in the indicative, but in the imperative mood, or in periphrases equivalent to it; what is called the knowledge of [b] duties; practical ethics, or morality.

Now, the imperative mood is the characteristic of art, as distinguished from science. Whatever speaks in rules, or precepts, not in assertions respecting matters of fact, is art: and ethics, or morality, is properly a portion of the art corresponding to the sciences of human nature and society [c] .*

The Method, therefore, of Ethics, can be no other than that of Art, or Practice, in general: and the portion yet uncompleted, of the task which we proposed to ourselves in the concluding Book, is to characterize the general Method of Art, as distinguished from Science.

§ 2. [*Relation between rules of art and the theorems of the corresponding science*] In all branches of practical business, there are cases in which [a]individuals are bound to conform their practice to a pre-established rule, while

*[51] It is almost superfluous to observe, that there is another meaning of the word Art, in which it may be said to denote the poetical department or aspect of things in general, in contradistinction to the scientific. In the text, the word is used in its older, and I hope, not yet obsolete sense.

[a-a]MS, 43, 46, 51, 56 Chapter XI
[b]MS our
[c]MS, 43, 46 : the remainder consisting of prudence or policy, and the art of education
[a-a944]MS, 43, 46 an individual is bound to conform his practice . . . of his task . . . which he is to govern his

there are others in which it is part of their task to find or construct the rule by which they are to govern their[a] conduct. The first, for example, is the case of a judge, under a definite written code. The judge is not called upon to determine what course would be intrinsically the most advisable in the particular case in hand, but only within what rule of law it falls; what the [b]legislature[b] has [c]ordained[c] to be done in the kind of case, and must therefore be presumed to have intended in the individual case. The method must here be wholly and exclusively one of ratiocination, or syllogism; and the process is obviously, what in our analysis of the syllogism we showed that all ratiocination is, namely the interpretation of a formula.

In order that [d]our[d] illustration of the opposite case may be taken from the same class of subjects as the former, we will suppose, in contrast with the situation of the judge, the position of [e]the[e] legislator. As the judge has laws for his guidance, so the legislator has rules, and maxims of policy; but it would be a manifest error to suppose that the legislator is bound by these maxims in the same manner as the judge is bound by the laws, and that all he has to do is to argue down from them to the particular case, as the judge does from the laws. The legislator is bound to take into consideration the [f]reasons[f] or grounds of the maxim; the judge has nothing to do with those of the law, except so far as a consideration of them may throw light upon the intention of the law-maker, where his words have left it doubtful. To the judge, the rule, once positively ascertained, is final; but the legislator, or other practitioner, who goes by rules rather than by their reasons, like the old-fashioned German tacticians who were vanquished by Napoleon, or the physician who preferred that his patients should die by rule rather than recover contrary to it, is rightly judged to be a mere pedant, and the slave of his formulas.

Now, the reasons of a maxim of policy, or of any other rule of art, can be no other than the theorems of the corresponding science.

The relation in which rules of art stand to doctrines of science may be thus characterized. The art proposes to itself an end to be attained, defines the end, and hands it over to the science. The science receives it, considers it as a phenomenon or effect to be studied, and having investigated its causes and conditions, sends it back to art with a theorem of the combinations of circumstances by which it could be produced. Art then examines these combinations of circumstances, and according as any of them are or are not in human power, pronounces the end attainable or not. The only one of the premises, therefore, which Art supplies, is the original major premise, which asserts that the attainment of the given end is desirable. Science then lends

[b-b]MS, 43, 46, 51, 56, 62, 65, 68 legislator [*printer's error?*]
[c-c]MS, 43, 46 commanded
[d-d]43, 46, 51 an [*printer's error?*]
[e-e]MS, 43, 46, 51, 56, 62, 65, 68 a
[f-f]MS, 43, 46, 51, 56 reason

to Art the proposition (obtained by a series of inductions or of deductions) that the performance of certain actions will attain the end. From these premises Art concludes that the performance of these actions is desirable, and finding it also practicable, converts the theorem into a rule or precept.

§ 3. [*What is the proper function of rules of art?*] It deserves particular notice, that the theorem or speculative truth is not ripe for being turned into a precept, until [a]the whole, and not a part merely, of the operation which belongs to science, has been[a] performed. Suppose that we have completed the scientific process only up to a certain point; have discovered that a particular cause will produce the desired effect, but [b]have[b] not ascertained all the negative conditions which are necessary, that is, all the circumstances which, if present, would prevent its production. If, in this imperfect state of the scientific theory, we attempt to frame a rule of art, we perform that operation prematurely. Whenever any counteracting cause, overlooked by the theorem, takes place, the rule will be at fault: we shall employ the means and the end will not follow. No arguing from or about the rule itself will then help us through the difficulty: there is nothing for it but to turn back and finish the scientific process which should have preceded the formation of the rule. We must re-open the investigation, to inquire into the remainder of the conditions on which the effect depends; and only after we have ascertained the whole of these, are we prepared to transform the completed law of the effect into a precept, in which those circumstances or combinations of circumstances which the science exhibits as conditions, are prescribed as means.

It is true that, for the sake of convenience, rules must be formed from something less than this ideally perfect theory; in the first place, because the theory can seldom be made ideally perfect; and next, because, if all the counteracting contingencies, whether of frequent or of rare occurrence, were included, the rules would be too cumbrous to be apprehended and remembered by ordinary capacities, on the common occasions of life. The rules of art do not attempt to comprise more conditions than require to be attended to in ordinary cases; and are therefore always imperfect. In the manual arts, where the requisite conditions are not numerous, and where those which the rules do not specify are generally either plain to common observation or speedily learnt from practice, rules may [c]often[c] be safely acted on by persons who know nothing more than the rule. But in the complicated affairs of life, and still more in those of states and societies, rules cannot be relied on, without constantly referring back to the scientific laws on which they are founded. To know what are the practical contingencies which require a modification

[a-a]MS, 43 all that part of . . . been completely
[b-b]+51, 56, 62, 65, 68, 72
[c-c]+56, 62, 65, 68, 72

of the rule, or which are altogether exceptions to it, is to know what combinations of circumstances would interfere with, or entirely counteract, the consequences of those laws: and this can only be learnt by a reference to the [d]theoretic[d] grounds of the rule.

By a wise practitioner, therefore, rules of conduct will only be considered as provisional. Being made for the most numerous cases, or for those of most ordinary occurrence, they point out the manner in which it will be least perilous to act, where time or means do not exist for analysing the actual circumstances of the case, or where [e] we cannot trust our judgment in estimating them. But they do not at all supersede the propriety of going through (when circumstances permit) the scientific process requisite for framing a rule from the data of the particular case before us. At the same time, the common rule may very properly serve as an admonition that a certain mode of action has been found by ourselves and others to [f]be well adapted to[f] the cases of most common occurrence; so that if it be unsuitable [g]to[g] the case in hand, the reason of its being so will be likely to arise from some unusual circumstance.

§ 4. [*Art cannot be deductive*] The error [a]is therefore[a] apparent, of those who would deduce the line of conduct proper to particular cases, from supposed universal practical maxims; overlooking the necessity of constantly referring back to the principles of the speculative science, in order to be sure of attaining even the specific end which the rules have in view. How much greater still, then, must the error be, of setting up such unbending principles, not merely as universal rules for attaining a given end, but as rules of conduct generally; without regard to the possibility, not only that some modifying cause may prevent the attainment of the given end by the means which the rule prescribes, but that success itself may conflict with some other end, which may possibly chance to be more desirable.

This is the habitual error of many of the political speculators whom I have characterized as the geometrical school; especially in France, where ratiocination from rules of practice forms the staple commodity of journalism and political oratory; a misapprehension of the functions of Deduction which has brought much discredit, in the estimation of [b]other countries[b], upon the spirit of generalization so honourably characteristic of the French mind. The common-places of politics, in France, are large and sweeping practical maxims, from which, as ultimate premises, men reason downwards to particular applications, and this they call being logical and consistent. For instance, they

[d-d]MS, 43 theoretical
[e]MS, 43, 46 for any reason
[f-f]MS, 43, 46, 51, 56 succeed in
[g-g]MS, 43, 46 in
[a-a]MS , therefore, is
[b-b]MS, 43 foreigners

are perpetually arguing that such and such a measure ought to be adopted, because it is a consequence of the principle on which the form of government is founded; of the principle of legitimacy, or the principle of the sovereignty of the people. To which it may be answered, that if these be really practical principles, they must rest on speculative grounds; the sovereignty of the people (for example) must be a right foundation for government, because a government thus constituted tends to produce certain beneficial effects. Inasmuch, however, as no government produces all possible beneficial effects, but all are attended with more or fewer inconveniences; and since these cannot [c]usually[c] be combated by means drawn from the very causes which produce them; it would be often a much stronger recommendation of some practical arrangement, that it does not follow from what is called the general principle of the government, than that it does. Under a government of legitimacy, the presumption is far rather in favour of institutions of popular origin; and in a democracy, in favour of arrangements tending to check the impetus of popular will. The line of argumentation so commonly mistaken in France for political philosophy, tends to the practical conclusion that we should exert our utmost efforts to aggravate, instead of alleviating, whatever are the characteristic imperfections of the system of institutions which we prefer, or under which we happen to live.

§ 5. [*[a]Every Art consists of[a] truths of Science, arranged in the order suitable for [b]some[b] practical use*] [c]The grounds, then, of every rule of art, are to be found in the theorems of science.[c] An art, or a body of art, consists of the rules, together with as much of the speculative propositions as comprises the justification of those rules. The complete art of any matter, includes a selection of such a portion from the science, as is necessary to show on what conditions the effects, which the art aims at producing, depend. And Art in general, consists of the truths of Science, arranged in the most convenient order for practice, instead of the order which is the most convenient for thought. Science groups and arranges its truths, so as to enable us to take in at one view as much as possible of the general order of the universe. Art, though it must assume the same general laws, follows them only into such of their detailed consequences as have led to the formation of rules of conduct; and brings together from parts of the field of science most remote from one

[c-c]+62, 65, 68, 72
[a-a]MS, 43, 46 *Art consists of the*
[b-b]+51, 56, 62, 65, 68, 72
[c-c]MS, 43, 46 The Logic of Art (it appears from all that has now been said) consists essentially of this one principle, that inquiry and discussion should take place on the field of science alone. The rules of art are required to conform to the conclusions of science, not to principles or premisses of its own. [*paragraph*]

another, the truths relating to the production of the different and heterogeneous conditions necessary to each effect which the exigencies of practical life require to be produced.*

[d]Science, therefore, following one cause to its various effects, while art traces one effect to its multiplied and diversified causes and conditions; there is need of[d] a set of intermediate scientific truths, derived from the higher generalities of science, and destined to serve as the generalia or first principles of the various arts. The scientific operation of framing these intermediate principles, M. Comte [e]characterizes[e] as one of those results of philosophy which are reserved for futurity.[*] The only complete example which he [f]points[f] out as actually realized, and which can be held up as a type to be imitated in more important matters, is the general theory of the art of Descriptive Geometry, as conceived by M. Monge.[†] It is not, however, difficult to understand what the nature of these intermediate [g]principles must generally[g] be. After framing the most comprehensive [h]possible conception[h] of the end to be aimed at, that is, of the effect to be produced, and determining in the same comprehensive manner the set of conditions on which that effect depends; there remains to be taken, a general survey of the resources which can be commanded for realizing this set of conditions; and when the result of this survey has been embodied in the fewest and most extensive propositions possible, those propositions will express the general relation between the available means and the end, and [i]will constitute the general scientific theory of the art; from which its practical methods will follow as corollaries.[i]

*[72] Professor Bain [see *Logic*, Pt. I, pp. 28ff.] and others call the selection from the truths of science made for the purposes of an art, a Practical Science; and confine the name Art to the actual rules.

[**Cours*, Vol. I, pp. 66ff.]

[†*Ibid.*, p. 68. The reference is to Gaspard Monge. *Application de l'analyse à la géométrie*. 4th ed. Paris: Bernard, 1809.]

[d-d]MS, 43 On this natural difference between the order of the propositions of Science and those of Art (science following . . . conditions), a principle may be grounded, which has been suggested with his usual sagacity, but not dwelt upon or accompanied with the necessary explanations, by M. Comte. It is, that there ought to be

[e-e]MS, 43 considers

[f-f]MS, 43 can point

[g-g]MS, 43, 46, 51, 56, 62, 65 general principles must

[h-h]MS conception possible

[i-i]MS, 43 from them, therefore, the practical methods of the art will follow as corollaries. But the further development of this idea may be left to those who have the means, and on whom the special office devolves, of practically applying it for the purpose of constructing, on scientific principles, the general theories of the different arts*. [*footnote:*] *A systematic treatise on the general means which man possesses of acting upon nature, is one of the works which M. Comte holds out the hope of his producing at some future time [*Cours*, Vol. VI, pp. 892–3]; and no subject affords a larger scope for the faculties of so original and comprehensive a mind.

§ 6. [a][*Teleology, or the Doctrine of Ends*] But though the reasonings which connect the end or purpose of every art with its means, belong to the domain of Science, the definition of the end itself belongs exclusively to Art, and forms its peculiar province. Every art has one first principle, or general major premise, not borrowed from science; that which enunciates the object aimed at, and affirms it to be a desirable object. The builder's art assumes that it is desirable to have buildings; architecture (as one of the fine arts), that it is desirable to have them beautiful or imposing. The hygienic and medical arts assume, the one that the preservation of health, the other that the cure of disease, are fitting and desirable ends. These are not propositions of science. Propositions of science assert a matter of fact: an existence, a coexistence, a succession, or a resemblance. The propositions now spoken of do not assert that anything is, but enjoin or recommend that something should be. They are a class by themselves. A proposition of which the predicate is expressed by the words *ought* or *should be*, is generically different from one which is expressed by *is*, or *will be*. It is true, that in the largest sense of the words, even these propositions assert something as a matter of fact. The fact affirmed in them is, that the conduct recommended excites in the speaker's mind the feeling of approbation. This, however, does not go to the bottom of the matter; for the speaker's approbation is no sufficient reason why other people should approve; nor ought it to be a conclusive reason even with himself. For the purposes of practice, every one must be required to justify his approbation: and for this there is need of general premises, determining what are the proper objects of approbation, and what the proper order of precedence among those objects.

These general premises, together with the principal conclusions which may be deduced from them, form (or rather might form) a body of doctrine, which is properly the Art of Life, in its three departments, Morality, Prudence or Policy, and Æsthetics; the Right, the Expedient, and the Beautiful or Noble, in human conduct and works. To this art, (which, in the main, is unfortunately still to be created,) all other arts are subordinate; since its principles are those which must determine whether the special aim of any particular art is worthy and desirable, and what is its place in the scale of desirable things. Every art is thus a joint result of laws of nature disclosed by science, and of the general principles of what has been called Teleology, or the Doctrine of Ends;* which, borrowing the language of the German meta-

*[56] The word Teleology is also, but inconveniently and improperly, employed by some writers as a name for the attempt to explain the phenomena of the universe from final causes.

[a–a952][*for* MS, 43, 46 *versions of* §6, *which was replaced by new* §§6 *and* 7 *in* 51, *see* Appendix H]

physicians, may also be termed, not improperly, the principles of Practical Reason.

A scientific observer or reasoner, merely as such, is not an adviser for practice. His part is only to show that certain consequences follow from certain causes, and that to obtain certain ends, certain means are the most effectual. Whether the ends themselves are such as ought to be pursued, and if so, in what cases and to how great a length, it is no part of his business as a cultivator of science to decide, and science alone will never qualify him for the decision. In purely physical science, there is not much temptation to assume this ulterior office; but those who treat of human nature and society invariably claim it; they always undertake to say, not merely what is, but what ought to be. To entitle them to do this, a complete doctrine of Teleology is indispensable. A scientific theory, however perfect, of the subject matter, considered merely as part of the order of nature, can in no degree serve as a substitute. [b]In this respect the various subordinate arts afford a misleading analogy. In them there is seldom any visible necessity for justifying the end, since in general its desirableness is denied by nobody, and it is only when the question of precedence is to be decided between that end and some other, that the general principles of Teleology have to be called in: but a writer on Morals and Politics requires those principles at every step.[b] The most elaborate and well-digested exposition of the laws of succession and coexistence among mental or social phenomena, and of their relation to one another as causes and effects, will be of no avail towards the art of Life or of Society, if the ends to be aimed at by that art are left to the vague suggestions of the *intellectus sibi permissus*, or are taken for granted without analysis or questioning. [c]

[b-b]+56, 62, 65, 68, 72

[c]51 [*paragraph*] This, in my conception, is the fundamental logical error of M. Comte. His theory of the natural history of society is far superior to any which preceded it, and explains and connects, in a very instructive manner, the leading facts of universal history. But he seems to think that a theory of the natural history of society is the whole of social philosophy, practical as well as theoretical, and that any attempt at an accurate definition or philosophical estimation of Ends is a needless, if not mischievous, subtlety. In this respect the various subordinate arts afford a misleading analogy. In them there is seldom any visible necessity for justifying the end, since in general its desirableness is denied by nobody, and it is only when the question of precedence is to be decided between that end and some other, that the general principles of Teleology have to be called in: but a writer on Morals and Politics requires those principles at every step. M. Comte, however, lays down no gẽneral doctrine of Teleology; but proceeds apparently on the conviction, that if he can produce a theory of society as it is, and as it tends to become, there is nothing more to be done. Instead, however, of confining himself to establishing theorems concerning the effects of causes, he gives decisions freely respecting right and wrong, every one of which necessarily involves some teleological principle; but having assumed no general teleological standard by which to try all subordinate ends, the particular teleological notions to which he appeals in each instance *pro hâc vice* are, like those of common men, a mere com-

§ 7. [*Necessity of an ultimate standard, or first principle of Teleology*] There is, then, a Philosophia Prima peculiar to Art, as there is one which belongs to Science. There are not only first principles of Knowledge, but first principles of Conduct. There must be some standard by which to determine the goodness or badness, absolute and comparative, of ends, or objects of desire. And whatever that standard is, there can be but one: for if there were several ultimate principles of conduct, the same conduct might be approved by one of those principles and condemned by another; and there would be needed some more general principle, as umpire between them.

Accordingly, writers on moral philosophy have mostly felt the necessity not only of referring all rules of conduct, and all judgments of praise and blame, to principles, but of referring them to some one principle; some rule, or standard, with which all other rules of conduct were required to be consistent, and from which by ultimate consequence they could all be deduced. Those who have dispensed with the assumption of such an universal standard, have only been enabled to do so by supposing that a moral sense, or instinct, inherent in our constitution, informs us, both what principles of conduct we are bound to observe, and also in what order these should be subordinated to one another.

The theory of the foundations of morality is a subject which it would be out of place, in a work like this, to discuss at large, and which could not to any useful purpose be treated incidentally. I shall content myself therefore with saying, that the doctrine of intuitive moral principles, even if [a] true, would provide only for that portion of the field of conduct which is properly called moral. For the remainder of the practice of life some general principle, or standard, must still be sought; and if that principle be rightly chosen, it will be found, I apprehend, to serve quite as well for the ultimate principle of Morality, as for that of Prudence, Policy, or Taste.

Without attempting in this place to justify my opinion, or even to define the kind of justification which it admits of, I merely declare my conviction, that the general principle to which all rules of practice ought to conform, and the test by which they should be tried, is that of conduciveness to the happiness of mankind, or rather, of all sentient beings: in other words, that the promotion of happiness is the ultimate principle of Teleology.*

*[65] For an express discussion and vindication of this principle, see the little volume entitled *Utilitarianism*.

pound, in varying proportions, of the old moral and social traditions, with the suggestions of his own idiosyncracies of feeling. The consequence seems to me to be, that no writer, who has contributed so much to the theory of society, ever deserved less attention when taking upon himself the office of making recommendations for the guidance of its practice.

[a]51, 56 it were

I do not mean to assert that the promotion of happiness should be itself the end of all actions, or even of all rules of action. It is the justification, and ought to be the controller, of all ends, but is not itself the sole end. There are many virtuous actions, and even virtuous modes of action (though the cases are, I think, less frequent than is often supposed) by which happiness in the particular instance is sacrificed, more pain being produced than pleasure. But conduct of which this can be truly asserted, admits of justification only because it can be shown that on the whole more happiness will exist in the world, if feelings are cultivated which will make people, in certain cases, regardless of happiness. I fully admit that this is true: that the cultivation of an ideal nobleness of will and conduct, should be to individual human beings an end, to which the specific pursuit either of their own happiness or of that of others (except so far as included in that idea) should, in any case of conflict, give way. But I hold that the very question, what constitutes this elevation of character, is itself to be decided by a reference to happiness as the standard. The character itself should be, to the individual, a paramount end, simply because the existence of this ideal nobleness of character, or of a near approach to it, in any abundance, would go further than all things else towards making human life happy; both in the comparatively humble sense, of pleasure and freedom from pain, and in the higher meaning, of rendering life, not what it now is almost universally, puerile and insignificant—but such as human beings with highly developed faculties can care to have.[a]

[a]§ 8.[a] [*Conclusion*] With these remarks we must close this summary view of the application of the general logic of scientific inquiry to the moral and social departments of science. Notwithstanding the extreme generality of the principles of method which I have laid down, (a generality which, I trust, is not, in this instance, synonymous with vagueness) I have indulged the hope that to some of those on whom the task will devolve of bringing those most important of all sciences into a more satisfactory state, these observations may be useful; both in removing erroneous, and in clearing up the true, conceptions of the means by which, on subjects of so high a degree of complication, truth can be attained. Should this [b]hope be realized,[b] what is probably destined to be the great intellectual achievement of the next two or three generations of European thinkers [c]will have been in some degree forwarded[c].

[a-a]MS, 43, 46 §7.

[b-b]MS, 43, 46 have been accomplished, something not unimportant will have been contributed towards] 51 have been accomplished,

[c-c]MS, 43, 46 : although, for the realization of the important results, of which it has been thus indirectly attempted to facilitate the attainment, mankind must ever be principally indebted to the genius and industry of ethical and sociological philosophers, whether of the present or of future times

APPENDICES

Appendix A

THE EARLY DRAFT OF THE *LOGIC*

Editor's Note

The manuscript, bound in brown morocco, is in the Pierpoint Morgan Library, New York (catalogued V/11/A), having been obtained in Britain sometime before 1909. As folioed by the library, it consists of 344 folios, *c.* 23.9 cm. × 19 cm. At the head of the first folio (above the title, "Introductory Matter") is written " "Mill's Logic" 2 Vols divide where marked cloth b$^{\underline{ds}}$", and on the first folio of the equivalent of Book II is written "Vol 2". On an attached initial sheet the following note appears: "This copy of Mr. Mill's Logic being an early manuscript draft was sent by the author to my Father the late Professor J. P. Nichol."

The manuscript is in three scribal hands (henceforth referred to as A, B, and C), with corrections, additions, and some footnotes in Mill's hand. The text is written on recto throughout, with the versos reserved for footnotes, except for the final five ff., which are covered recto and verso with text. Following one of his common practices, Mill used a sequence of letters, A to P, with a second N, placed in the upper right-hand corner of rectos, to indicate "gatherings," usually of 20 folios. Three of these letters, the K, L, and M, are inscribed over partly erased letters G, H, and I. The paper is of various makes, and three dates, 1833, 1834, and 1836.

This evidence, plus short pages and gatherings, one long cancelled passage (ff. 114–20), the content, and some external evidence, establishes that the scribes copied parts of the manuscript at different times. The table on the following two pages sets out the relevant internal evidence. Inferences drawn from this evidence will be found in the section of the Textual Introduction dealing with the history of the text of the *Logic* (see lvii ff.).

In that section a summary comparison is made of the texts of the Early Draft and the Press-copy Manuscript. To facilitate comparison of the early and final versions, parallel passages are indicated in the text of the Early Draft. The book and chapter titles of the final version are given in square brackets as, for example, at 969 below, where it will be seen that the chapter of the Early Draft entitled "Statement of the Problem" corresponds to Bk. I, Chap. i of the final version. Because the wording is in many cases very close in the two versions, it is possible to indicate section and paragraph parallels, which are also placed in

GATHERING	SCRIBE	FOLIOS	CHAPTER	PAPER MAKE AND DATE	COMMENTS
A	A	1–20	Introductory Matter	Dewdney, 1833	f. 1 has only chap. title in JSM's hand; ff. 19–20 blank
B*	A	21–30 31–40	Statement of the Problem Of Names	Whatman, 1834	
C	A	41–56 57–60	" (cont.) Classification of Things	Whatman, 1834	
D	A	61–80	" (cont.)	Whatman, 1834	f. 80 is short about 2 lines, but f. 81 begins with new ¶
E	A	81–5 86–100	" (cont.) Of Predication	Dewdney, 1833 (ff. 81–2, 99–100), and Whatman, 1834 (ff. 83–98)	
F	A	101–20	" (cont.)	Dewdney, 1833	ff. 114–20 cancelled, beginning at 2nd ¶ on f. 114; cancelled f. 120 is short
G	B	121–33 134–40	" (cont.) Of the Predicables or Universals	Magnay, 1834	ff. 121-33 replace cancelled ff. 114–20
H	B	141–54 155–60	" (cont.) Of Definition	Balston, 1833 (ff. 141–4, 151–6), and Whatman, 1833 (ff. 145–50, 157–60)	
I	B	161–80	" (cont.)	Balston, 1833 (ff. 161–4, 169–70, 173–6), and Whatman, 1833 (ff. 165–8, 171–2, 177–80)	
J†	B	181–97	" (cont.)	Balston, 1833 (ff. 187–90), 195–7), and Whatman, 1833 (ff. 181–6, 191–4)	f. 188 short; ff. 189–97 blank. Gathering short 3 ff.

GATHERING	SCRIBE	FOLIOS	CHAPTER	PAPER MAKE AND DATE	COMMENTS
K[G]‡	A	198–204 205–17	Of Inference, or Reasoning Of Ratiocination, or Syllogism	Dewdney, 1833	A pencilled note, "Vol 2", on f. 198 may be in JSM's hand
L[H]‡	A	218–35	" (cont.)	Whatman, 1834	Gathering short 2 ff.
M[I]‡	A	236–54	" (cont.)	Dewdney, 1833	ff. 244–54 blank; Gathering short 1 f.
N	C	255–63 264–74	Of Trains of Reasoning Of Deductive Sciences	Wilmot, 1836	
O	C	275–94	Of Demonstration, and Necessary Truths	Magnay, 1834 (ff. 275–6, 293–4), and Wilmot, 1836 (ff. 277–92).	Though of the same date, the Magnay paper here differs in watermark from that used in Gathering G
P§	C	295–314	" (cont.)	Magnay, 1834 (ff. 299–310), Wilmot, 1836 (ff. 295–8, 311–14)	ff. 299–314 blank
N²§§	C	315–22 323–9 330–4	Of Induction in General Of the Various Grounds of Induction Of the Uniformity in the Course of Nature	Whatman, 1833 (ff. 315–16, 325–32), and Balston, 1833 (ff. 317–24, 333–4)	Written recto and verso. There are some differences between this hand and that in Gatherings N, O, and P, but not more than can be explained by the difference in time of inditing

*This gathering begins the equivalent of Book I in the final version of the *Logic*.
†This gathering concludes the equivalent of Book I in the final version of the *Logic*.
‡The square-bracketed letter is erased and written over.
§This gathering concludes the equivalent of Book II in the final version of the *Logic*.
§§The superscript number is editorially added to distinguish this gathering from N above.

square brackets. These indicators are normally in roman type; when they are in italic type they indicate that, while the wording is different in the two versions, the relevant section or paragraph in the final version replaced that in the Early Draft.

The final version being much fuller, there are gaps in the sequence of the inserted indicators, but an attempt has been made to show what happened to each paragraph of the Early Draft: when the material was deleted or greatly rewritten, footnotes are added; when the sequence was altered, the normal indicators appear non-sequentially (see, for example, 966, where in the Introductory Matter—equivalent to the Introduction—after the first paragraph of §7, the Early Draft has the equivalent of the second paragraph of §1, and then returns to the second paragraph of §7). When there is neither a footnote nor an indicator at the beginning of a paragraph, the preceding footnote or indicator gives the disposition; that is, in most cases, the paragraph was incorporated with the previous one. Sometimes Mill divided paragraphs in rewriting; in such cases indicators appear within the paragraphs of the Early Draft. It should be noted that the indicated parallels are between the Early Draft and the 8th edition, so that comparisons can be made by using the texts here printed. The Early Draft is, of course, closer to the Press-copy Manuscript, and therefore the variants between the 8th edition and the Press-copy Manuscript must be consulted.

Editorial alterations in the text have been kept to the minimum compatible with fluent reading. Footnotes describe those changes in Mill's hand that indicate later rethinking of a point, but no indication is given of the places where Mill had to supply or correct a word that the scribe could not read, or of the places where the scribe made a current correction. The editorial footnotes are, with their indicators, given in square brackets; the manuscript's footnote indicators have been regularized. Superscript abbreviations have been lowered.

The spelling of the original has been accepted (except in the few cases listed in the note below), as a record of the scribes' habits. Only where there are syntactic oddities does "[*sic*]" appear. The corrections that have been made may be categorized as follows: 1. scribal repetitions deleted, 2. missing words supplied in square brackets, 3. words corrected, 4. italics regularized, 5. quotation marks regularized, 6. punctuation and capitalization regularized.*

*Under these categories, the following should be noted:

1. Repeated words deleted: of (962.19, 1021.n23), as the other (998.22–3), in us (999.46, at end of sentence), the (1011.43), may (1018.3 between "also" and "be"), that (1105.22).
2. Words supplied: [have] (972.35), [in] (993.46), [of] (1005.13), [it] (1025.34), [other] (1051.11).
3. Words corrected: larger *for* large (967.39), concrete *for* conrete (985.12), place *for* places (993.2), representation *for* prerepresentation (994.28), not *for* no (999.35), that *for* than (1021.n24, 1028.19), of *for* in (1026.47, first "of"), defining *for* declaring (1041.38), down *for* downs (1043.1), consequences *for* consequencies (1051.2, 1051.46), *memoria for momoria* (1057.7), major *for* minor (1057.27), premiss *for* process (1063.32), deaths *for* death (1068.6), another *for* other (1091.n7), phenomena *for* phenomenon (1097.26), today's *for* to day's (1102.2), men's *for* mens (1109.46).
4. Italics regularized: *John's* (974.7), *principii* (1065.33), *b* (1066.17).
5. Quotation marks regularized: in seven places single quotation marks have been made double; in one case (1040.19-20) opening and closing quotation marks have been supplied; in two cases (1040.28, first set, and 1050.n1, second set) opening quotation

As a further aid to the study of the development of Mill's thoughts on logic, the Bibliographic Appendix and the Index list references to the Early Draft, italicized and in parentheses, immediately after the parallel references to the text of the 8th edition. References that appear only in the Early Draft are given in italics at the end of the list of references to the 8th edition.

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marks have been supplied; in two cases (1027.13, 1045.47) closing quotation marks have been supplied. Within quotations, single replace double quotation marks.

6. As the scribes (like Mill himself) sometimes omit punctuation at the end of a line, periods and commas have been added to supply the deficiency, and a few other commas have been added where the reading was uncertain; in five places where the sense required the change, commas have been substituted for periods (in only one of these [999.21] is a sentence involved); in two places (1008.5, 1076.44) a colon has been substituted for a period, and in one place (1049.40, first instance) a comma for a semicolon, and in one (1105.34, second instance) a question mark for a period. Periods have been added after "&c" in five places, and periods placed outside parentheses in two. Capitalization has been altered only where the sense and consistency required a change: Elements *for* elements (1047.1), All *for* all (1053.32), men *for* Men (1059.31), negroes *for* Negroes (1059.42,46), Empire *for* empire (1073.12), One *for* one (1093.6, 1093.10, 1094.44), Three *for* three (1093.7), Or *for* or (1101.10,16).

It should be mentioned that some readings are uncertain; Scribe A, in particular, makes little discrimination between K and k, and S and s (the former characteristic being shared with Mill, as noted in the Textual Introduction above).

INTRODUCTORY MATTER[*]

[Introduction]

[§1]

[¶1] There is as great a diversity in the modes which different authors have adopted of defining Logic, as in their modes of treating of it. This is no more than we might expect, on all those subjects on which different authors have availed themselves of the same language, as a means of delivering ideas in any respect different. Morals and Jurisprudence are liable to this remark in common with Logic. Almost every philosopher having taken a different view of some of the particulars which these branches of knowledge are usually understood to include, each has so framed his definition of the subjects themselves as to indicate beforehand his own peculiar tenets, and perhaps to beg the question in their favour.

[§2]

[¶1] Logic has been often said to be the Art of Reasoning. This definition has been adopted, and improved, by a recent writer of great eminence, who defines Logic to be the Science, as well as the Art, of Reasoning: the analysis of the mental process which takes place whenever we reason, as well as the practical rules, which have been grounded upon that analysis, for conducting the process correctly. The propriety of this emendation is obvious. A right understanding of the mental operation itself, is the only basis on which a connected or comprehensive system of rules fitted for the direction of it, can possibly be founded. Art necessarily presupposes Science: and every Art should bear the name of the Science on which it rests, were it not that several Sciences are often necessary to form the groundwork of one single Art. Such is the complication of human affairs that to enable one thing to be *done*, it is often requisite to *know* the natures and properties of many.

[¶2] Logic, then, comprises a Science as well as an Art. But it admits of question whether even when thus amended, the above definition of Logic is coextensive with the received employment of the term.

The word Reasoning, like almost all scientific terms which are in common use, abounds in ambiguities. With some persons, Reasoning means Syllogizing; or, in other words, that mode of inference which may be called with sufficient accuracy for the present purpose, concluding from generals to particulars. With others again, to reason is simply to infer any truth from truths already known. Induction, therefore, according to this nomenclature, is as much entitled to be called Reasoning, as the demonstrations in Euclid.

[¶3] Writers on Logic have generally preferred the former acceptation of the term; the latter, and more extensive signification is that in which I shall use it. The reasons for this departure from the custom of professed Logicians will ap-

[**An* A *in the top right corner of f.1 (which contains only the title,* Introductory Matter*) indicates the first gathering. Gatherings* A *through* F *are in Scribe A's hand.*]

pear as we advance. To the general usage of the English language, I believe mine to be the nearer approximation.

[§3]

[¶1] But even this, the widest sense in which the term Reasoning is ever employed, is not so wide as to be coextensive with the ordinary acceptation of the word Logic. The practice of using the denomination Logic to denote peculiarly the Science which treats of Argumentation, originated with the Schoolmen: yet even in *their* systematic treatises, Argumentation formed the subject only of the third Part: the two former treated of Terms, and of Propositions; under one or other of which heads were included, Definition, and Division. Professedly, indeed, all these subjects were attended to only on account of their connexion with Reasoning, and as a preparation for understanding the doctrine and rules of the Syllogism. Yet they were treated much more minutely, and dwelt on at much greater length than that purpose required. More recent writers on Logic have generally understood that term nearly in the sense in which it was employed by the Authors of the Port Royal Logic; viz: as synonymous with the Art of Thinking. Nor is this large acceptation of the word confined to philosophers. Even in common conversation, the ideas which seem to be connected with the word Logic, include at least precision of language and accuracy of classification: and we, perhaps, oftener hear ordinary persons speak of a logical arrangement, or of expressions logically defined, than of a conclusion logically deduced from premises. But to name, to affirm or deny, to define, to classify, are not acts of inference; they are not processes by which, from premises, we deduce a conclusion. Whether, therefore, we assume as a standard the practice of those, who have made the subject their particular study, or that of popular writers & common discourse, we shall find reason to include in the province of Logic several operations of the intellect which it is not customary to consider as falling within the meaning of the terms Reasoning or Argumentation.

[¶2] These operations might be brought within the compass of the Science, and the additional advantage be obtained, of a very simple definition, if an extension, sanctioned by very high authorities, were given to the meaning of the term; by defining Logic to be the Science which explains, and the rules which may be devised to assist, the operations of the human understanding in the pursuit of truth. For to this ultimate end, naming, classification, definition, and all the other operations over which Logic has ever claimed jurisdiction, are merely subsidiary. The object of all of them is that a person may enable himself to know at any given time, all those truths the knowledge of which is needful for him at that time. Naming has, indeed, in addition to this, an ulterior object; to enable him to communicate this knowledge to others. But when viewed with reference to this purpose, it has never been considered to fall within the province of Logic; the sole object of which is the guidance of one's own thoughts. The fittest means of communicating them to others, fall under the consideration of Rhetoric, in the large extent in which that Art was conceived by the ancients; or of the still more extensive art of Education. Logic takes cognizance of any of our intellectual operations, only as they conduce to the perfection of our own knowledge, and of our command over that knowledge for the purposes of our own use. If there were but one rational being in the universe, that being might be a perfect

Logician; & the Science & Art of Logic would be precisely the same for that one person, as for the whole human race.

[§4]

[¶1] The definition, however, which we have now suggested, although exempt from the fault which was chargeable upon the former one, that of including too little, labours under the opposite vice of including too much. It comprehends some things never yet considered as belonging to Logic; and some which are altogether unfit to be classed, in any scientific arrangement, under the same head with those which will be treated of in the present work.

[¶2] Truths are known to us in two ways: some are known directly, and of themselves; some through the medium of other truths. The former are the subject of *intuition* or *consciousness*; the latter, of *inference*. The truths which we know by intuition are the original premisses from which all others are deduced: for the truth of the conclusion being founded upon the assumption that the premisses are already known to be true, we never could arrive at any knowledge by reasoning, unless there were something which we knew antecedently to all reasoning.

[¶3] Examples of truths which are known to us by immediate consciousness, are our own sensations. Examples of truths which we know only by way of inference, are, events which took place while we were absent; the occurrences recorded in history; or the theorems of mathematics. The two former we infer from the testimony which is adduced, or from the traces which the events have left behind them; the latter, from the premisses which are laid down in books of geometry, under the title of definitions and axioms.

[¶5] Whatever is known to us by consciousness, is known beyond possibility of question. What one sees & feels, whether bodily or mentally, one cannot but be sure that one sees & feels. No Science is required for the purpose of arriving at such truths; no rules of art can render our knowledge of them more certain than it is in itself. There is no Logic, therefore, for this class of truths.

[¶6] But we may fancy that we see & feel, what in reality we infer. A truth, or supposed truth, which is really the result of a very rapid inference, may seem to be apprehended intuitively. It has long since been agreed by philosophers of all schools, that this mistake is actually made in so familiar an instance as that of the eye-sight. There is nothing which we appear to ourselves to be more directly conscious of, than the distance of an object from us. Yet it has been proved to absolute certainty, and is now admitted by all who have examined the subject, that when we fancy that we see distance, what we really see is only a certain diminution of apparent size, and a certain faintness of colour; and that our estimate of the object's distance from us is the result of a comparison, (made with so much rapidity that we are unconscious of making it) between the size and colour of the object as they appear to us, and its size & colour as they appeared on former occasions, when we knew at what distance from us it was. The perception of distance by the eye, which seems so like intuition, is thus, in reality, an inference, grounded on experience: an inference, too, which we learn to make, and which we make more & more correctly as our experience encreases; though in familiar cases it takes place so rapidly as to appear exactly on a par with those perceptions of sight which are really intuitive, our perceptions of colour.

[¶7] Of the Science, therefore, which explains the operations of the human understanding in the pursuit of truth, nothing can form a more essential part than the inquiry, what are the truths which are the subject of intuition or consciousness, & what are those which we merely infer. But this inquiry has never been considered a portion of Logic. It is the subject of another, and a perfectly distinct branch of Science: the higher or transcendental metaphysics; as that department of Science may be termed which attempts the solution of the question, what part of the furniture of the mind belonged to it originally, and what part was constructed by itself out of materials furnished to it from without. To this Science belong the great and much agitated questions, of the existence of matter and of spirit; of the existence of any connexion between cause and effect, other than the constancy of their succession; of the reality of time & space as entities *per se*, distinguishable from the objects which are said to exist *in* them. For, in the present state of these various questions, it is universally allowed that the existence of matter, or of spirit, of space, or of time, cannot be *proved*; & if known at all, is known by immediate intuition. To the same Science belong the inquiries into the nature of conception, perception, memory, and belief; all of which are operations of the understanding in the pursuit of truth; but operations with which the Logician has no concern, further than to assume their existence as a fact. To this Science must also be referred the following, and all analogous questions: Whether our emotions are innate, or the result of association: Whether God, & duty, are realities the existence of which is manifest to us *a priori* by the constitution of our rational faculty; or whether our ideas of them are acquired notions, the origin and growth of which we can trace and explain, and the reality of the objects themselves a question not of consciousness or intuition, but of evidence and reasoning. To determine, in short, what are, and what are not, the truths known *per se*, the original premisses of all our knowledge; is the object of the higher, or remoter metaphysics.

[¶8] But as soon as it is known, or assumed, that a particular truth or a proposition into the truth of which we are inquiring, is not intuitively obvious, but requires proof; in other words, is not to be admitted but as an inference from some other truth; then, the operation of the understanding in judging of the sufficiency of the evidence, or in judging what sort of evidence ought to be required, is properly the subject of Logic.

Another distinction requires to be made. The province of Logic is not the evidence itself, but the operation of the understanding in judging of the evidence. Logic does not teach us *by what* evidence a given fact becomes known to us; but *how we are to judge of* the evidence which shall be sufficient to prove that fact. It does not itself solve the problem, but determines whether it *has* been solved satisfactorily, and if not, what is still wanting to render the solution complete.

[§5]

[¶1] If it did more, it would embrace all human knowledge.

All human life is taken up in deducing conclusions from premisses. Every one has daily, hourly, and momentary occasion for ascertaining numerous particular facts; not from any general purpose of adding to his stock of knowledge, but because the individual facts themselves are of moment to him, or to those whose interests are under his charge. The business of the judge, of the commander, of the navigator, of the physician, of the husbandman, is merely to judge of evi-

dence, and to act accordingly: and as they do this well or ill, so they discharge well or ill the duties of their several callings. It is the only occupation in which the intellect never ceases to be engaged; and is the subject not of Logic, but of knowledge in general. [¶2] Logic does not instruct the surgeon from what symptoms he is warranted in inferring a violent death. This he can only learn from his own experience and observation, or that of others, recorded in the books of his peculiar Science. But though Logic will not tell him what the symptoms are, it will tell him how, where he already knows them, he may determine whether they are or are not conclusive. Though it will not supply the place of experience, it will guide his understanding in judging whether his experience is sufficient to establish any given proposition, and if not, what kind of additional experience he has still to seek, in order to obtain a solution of the problem.

[¶3] It is in this sense that Logic is, what Lord Bacon most expressively called it, *Ars artium*; the Science of Science itself. All Science consists of premisses and conclusions, of the Proof, and That which is proved: now Logic analyses the process or processes by which, in all the Sciences, the mind proceeds from the premisses to the conclusion, from the proof to that which is to be proved. [*]Each particular department of Science furnishes the evidence necessary to establish its own particular conclusions, but Logic decides whether that evidence is sufficient; and if not, sends back the question to the Science to which it belongs, for such further evidence as observation and experiment can be made to yield; having first indicated the exact nature of the deficiency to be supplied.*

[§6]

[¶2] A Science may certainly be brought to a very advanced stage of improvement without the application of any other logic to it than what all persons who are said to have a sound understanding acquire, acquire empirically in the course of their studies. But this is only saying what every one knows; that a thing may be very well done by particular individuals, before there has been any accurate thinking respecting the mode of doing it. This does not, however, prove that accurate thinking is of no use. Men judged of evidence, and often very correctly, before Logic was studied, as men talked and made themselves understood before they thought of inventing rules of grammar. But they talk and write far more intelligibly by means of grammar, and they judge of evidence far more correctly after having studied Logic. No Science is completely a Science, until Logic is

[**The next sentence gives an embryonic form of material later used in* Bk. VI, Chap. xii.]

*Logic, therefore, although differing from the higher metaphysics like the other half of a great whole, (the former being the Science of the appreciation of evidence, the latter having for its object to determine what are the propositions for the establishment of which, evidence is required), yet when viewed under another of its aspects, stands in the same relation to this, its sister Science, as it does to all the other Sciences. For, transcendental metaphysics, in endeavouring to solve its own peculiar problem, must employ means the validity of which falls under the cognizance of Logic. It must either proceed merely by a closer interrogation of our consciousness, a stronger effort of attention to discover, what passes within us; (in which case, it scarcely performs the office of a Science, but of a mere exertion of will); or else, if this method is insufficient to attain the end of its inquiries, it must proceed, like other Sciences, by *evidence.* But the moment this Science begins to draw conclusions from evidence, that instant Logic becomes the sovereign judge of the sufficiency of the proof.

superadded to it. Whatever may be the case with the *collection* of the evidence, the *appreciation* of it is mere empiricism, until the process of drawing conclusions from evidence has been subjected to the same accurate analysis, which it is already allowed must be supplied to the evidence itself, in order to constitute a Science. In whatever degree, therefore, Science is superior to empiricism; in whatever degree accurate and careful analysis affords a surer ground to proceed upon, than extemporaneous and gross apprehension; in that same degree a Science which has been brought into subordination to the Science of Logic, is more certain and more valuable than one which has not.

[§7]

[¶1] Logic, therefore, may be defined, the Science which treats of all operations of the human understanding, subservient to the estimation of evidence; both the actual operation of proceeding from premisses to a conclusion, and all the other intellectual operations which are auxiliary to this. It includes, therefore, naming, and predication; that is to say, the operation of giving names, and that of applying them to their principal use; and it also includes Definition, & Classification. For the use of every one of these operations (putting all other minds than one's own out of consideration) consists in their being means, not only of keeping our conclusions themselves, and the evidence of them, permanent, and readily accessible, in the memory; but also of so marshalling the evidence, as to enable the mind to judge more easily, and with fewer chances of error, whether the evidence is sufficient or not. Language has been called an instrument of thought; and systematic arrangement is equally entitled to be so characterized: now the word thought, if it means anything, means proceeding from truths which are self-evident, to establish other truths. Language and Classification being instruments for accomplishing this end, the analysis of the instruments is an indispensable part of the analysis of the operation itself. The art is not complete, unless another art, that of constructing the tools and fitting them for the purposes of the art, is embodied in it.

[§1, ¶2] If any of my readers has been accustomed to use the word Logic in any other sense than that which I have attached to it; and finding old habits the most convenient, should be disinclined to alter them at my bidding; it is not probable that I could state in this place the advantages of my own definition, in such a manner as to convince him. But, if he peruse this work to the end, he will probably be enabled, from the view which I take of the particulars comprehended in the Science, to collect the reasons which induce me to define it as I have done. It is useless to dispute about the definition of a Science until we are agreed about the Science itself. Each man builds his wall according to the shape and dimensions of his own piece of ground. If my definition is not the right definition of Logic, it is the right definition of the subject of this book. As much as is to be expected from a definition placed at the commencement of a subject, is that it should define the scope of our inquiries.

The definition we set out with, is seldom that which a thorough knowledge of the subject shews to be the most appropriate. The particulars, which it is the object of the definition to segregate from all others, are not yet known to us, and till then we cannot know what is the most natural or the most convenient mode of grouping them. The definition with which we begin, is merely the statement of a problem: the definition with which we end is the solution of that same problem,

or as much of the solution as can be conveniently and usefully compressed into the compass of a single proposition. So long, therefore, as the Science is imperfect, the definition must partake of its imperfections: and, if the former is progressive, the latter ought to be so too. The reader who shall have accompanied me through the details of the subject, may turn back and question my definition, but as against any one else I claim full liberty of stating the problem in my own way.

[§7, ¶2] My object, then, will be to attempt the correct analysis of the intellectual process called reasoning or inference, and of such other mental operations as are intended to facilitate this. [¶3] I do not undertake to analyse these operations into their ultimate elements. I shall only endeavour that the analysis as far as it goes may be correct, and that it may go far enough for the practical purposes of Logic, considered as an Art. The analysis of a phenomenon is not like a connected chain of proof. If one link of an argument breaks, the whole drops to the ground; but one step towards an analysis holds good of itself, and has a substantial value of its own, though we should never be able to make a second. The analytical processes of chymistry are not the less valuable, though it may hereafter be discovered that all which we have called simple substances are in reality compounds. All things have at any rate been decomposed into those elements. Whether they admit of still further decomposition by the decomposition of the elements themselves, is an important inquiry, but one which does not affect the certainty of the Science up to that point.

[¶4] I shall attempt to analyse the process of inference, and the processes subordinate to inference, so far only as may be requisite for determining with precision what is necessary for the correct performance of those processes, & framing rules to assist it accordingly. Any further & minuter analysis I leave to transcendental metaphysics; which in this, as in other parts, of our mental nature, decides what are ultimate facts, and what are resolvable into other facts. And I believe it will be found that the conclusions at which I arrive have no necessary connexion with any particular views respecting the ulterior analysis. The partizans of Hartley and those of Reid, those of Locke and those of Kant, might concur in nearly everything that I shall have to say, consistently with the fundamental principles of their several systems. Particular and detached opinions of all of them will no doubt occasionally be contested, since all of them are Logicians as well as Metaphysicians; but the field in which their great battles have been fought, lies beyond the boundaries of our Science.

Being thus unconnected with those questions which have divided philosophers in the higher regions of Metaphysics, the present work if it be unobjectionable in other respects will be adapted both to a larger number of students, and to an earlier period of their philosophical studies, than an analytical treatise on Mental Philosophy in general.

[Book I: Of Names and Propositions]

STATEMENT OF THE PROBLEM[*]

[Chapter i: Of the Necessity of Commencing with an Analysis of Language]

[§*1*†]

The object of the present enquiry being in the first place to analyse the process by which the understanding proceeds from truths which are known, to establish others which are unknown; the purport of the question which is to be enquired into cannot be understood, unless we understand distinctly what is meant by a truth; what is that property of an assertion, which determines us to say that it is a true assertion; what is the peculiarity which distinguishes the true from the false. When this shall be cleared up, (if such fate should attend the present attempt), the great problem of the Science may be clearly stated, which is always a great way, and, in this case, almost half way, towards its solution. For as logical studies in no way contribute more to give soundness to the understanding, than by accustoming it to enunciate both what it knows, and what it seeks to know, in definite and unambiguous expressions; so the difficulties of Logic itself will in a great measure vanish, when the few fundamental notions with which the Science is principally conversant are distinctly and accurately conceived.

In receiving anything as a Truth, there are two different matters which demand attention. One is, the act or operation of the mind when it is said to *believe*; the other is, that which it believes. We must distinguish, in short, the thing believed, & the state of the believing mind.

With respect to the nature of the phenomenon of Belief, the Logician, as such, has no concern with it. Every one knows what kind of feeling it is; and for the purposes of Logic, it is not necessary to know anything more of it than what every one knows. To analyse the act of Belief, or to determine whether it is susceptible of analysis, must be left to the higher metaphysics. To ascertain the nature of the immediate Object of Belief, is all that will here be aimed at.

[§2]

[¶1] What is the immediate object of Belief, or, in other words, what every Truth, or everything which is received as Truth, is found, when correctly analysed, to consist in, is a question which we shall best solve *a posteriori*; by examining the import of all the various Kinds of Propositions. For our belief, when put into words, always expresses itself in a Proposition. We believe that the thing, which we conceive in our minds, exists or exists not; is, or is not, so and so. What, by a convenient misapplication of an abstract term, we call a Truth, is more properly called a True Proposition. In proceeding to enquire

[**Gathering* B *begins with this folio; this is the opening of the equivalent of* Bk. I *of the final version.*]

[†*In the rewriting the following three paragraphs were partly used in* Chap. i, §1, ¶5, *and partly conflated with the material in the* Introduction, §4.]

what constitutes a True Proposition, it is necessary to begin by defining, that is, analysing, the notion of a Proposition itself.

[¶2] For the present purpose, the ordinary and simple definition will be sufficient. By a Proposition, is meant *discourse*, in which something is affirmed or denied of something. Thus, in the proposition, Gold is yellow, the quality *yellow* is affirmed of the substance *Gold*. In the proposition, Franklin was not born in England, the fact expressed by the words *born in England* is denied of the man, Franklin.

[*]An affirmative proposition is also called a predication. To predicate one thing of another, is to affirm one thing of another.

[¶3] Every proposition consists of three parts, which are called, the *subject*, the *predicate*, and the *copula*. The predicate is the name denoting that which is affirmed or denied. The subject is the name denoting the person or thing, which something is affirmed or denied of. The copula, is the sign denoting that there is an affirmation or denial; and thereby enabling the hearer or reader to distinguish a Proposition, from any other kind of discourse. Thus, in the proposition, The Earth is round, the predicate is the word *round*, which denotes the quality affirmed: *the earth*, words denoting the object *of* which that quality is affirmed, are the subject of the proposition. The word *is*, which serves as the connecting mark between the subject and predicate, to shew that one of them is affirmed of the other, is called the copula.* [Bk. I, Chap. iv, §1, ¶3] It may perhaps be thought that this is not all which is signified by the copula; that it also denotes existence; as, for instance, in the proposition, *Socrates is just*, it may be supposed to be implied, not merely that the quality *just* may be affirmed of Socrates, but moreover that Socrates *is*, i.e. exists. Undoubtedly this shews that there is an ambiguity in the word *is*; a word, which not only performs the functions of the copula in affirmations, but has also a meaning of its own, in virtue of which it may itself be made the predicate of a proposition. That the employment of it as a copula, however, does not necessarily include any affirmation of existence, appears from such a proposition as this, A centaur is a fiction of the poets: where it cannot possibly be implied that a centaur exists, since the proposition itself expressly asserts that it has no real existence.

[*Ibid.*, ¶4] If the Greek philosophers, and their followers, the Schoolmen, had adverted to this double meaning of the verb *to be* (for the ambiguity exists equally in all languages) they would have been saved much quibbling, many paradoxes, and the creation of several needless abstractions, which they mistook for objective realities. Yet it becomes us not to triumph over the gigantic intellects of Plato and Aristotle, because we are now able to preserve ourselves from errors into which they, perhaps inevitably, fell. The fire-teazer of a modern steam-engine produces by his exertions far greater effects than Milo of Crotona could, but he is not therefore a stronger man. The Greeks seldom knew any language but their own. This rendered it far more difficult for them than it is for us, to

[**This paragraph disappeared in the rewriting.*]

*When the predicate of the proposition is not a substantive or adjective, but the peculiar species of word termed a *verb*, the necessity of a separate word to perform the office of a copula is superseded. We do not say "Fire is burn," but "Fire burns." The copula, however, is as much a necessary part of this as of any other proposition. By the copula, is meant *the sign*, of whatever kind, which denotes that there is an *assertion*: and this sign, in the proposition "Fire burns," is the letter *s*, which constitutes the inflexion of the predicate *burn*. [*This note is in JSM's hand.*]

acquire the habit of detecting ambiguities. Among the many inestimable advantages derived from the systematic study of more languages than one, this is among the greatest. By finding that a single word in the foreign language often corresponds, on different occasions, to different words in our own, we learn practically that the same word does not always mean the same thing. Even the strongest understandings, when not thus exercised, find it difficult to believe of things which have a common name, that they have not also, in some respect or other, a common nature; and often take infinite quantity of fruitless trouble to find it out; as the writings of the two great philosophers whom we recently named, abundantly exemplify.

The ambiguity of the word which has been selected to perform the office of the copula, has misled the moderns scarcely less than the ancients; though their mistakes do not appear equally ridiculous, precisely because our understandings are not yet so completely emancipated from the influence of them. The quantity of futile speculation which has been caused by a misapprehension of the nature of the copula was first hinted at by Hobbes; but Mr. Mill was, I believe, the first who pointed out, how many errors in the received systems of philosophy (errors which this is not the place for particularizing) it has partly to answer for.

A Proposition, then, being defined to be, a portion of discourse, by which something denoted by a name called the predicate, is affirmed, or denied, of something denoted by a name called the subject; we are next to enquire what is meant by a True Proposition.

[*]The ordinary explanation of the nature of a true proposition, which, though superficial, is sufficient for the common purposes of human intercourse, is also the point from which, in any attempt towards a deeper analysis of the truth of propositions, it is necessary to start. This explanation cannot be more appropriately given than in the words of the Schoolmen: *Propositio vera est, quæ est conformis rei significatæ*: A true proposition is that, the assertion contained in which is in accordance with the fact. This, however, only staves [*sic*] the difficulty further back, without removing it; for what does the definition amount to? merely to this: that a proposition is true, if the fact asserted in it is true. The question, of course, still remains, What is meant by a fact? Or what constitutes the truth of facts? The answer to this question is very obvious in some cases. When, for instance, the proposition is, that on such a day, I fell off a horse and hurt my shoulder, every one understands what is the matter of fact asserted; and it is not possible to give any more recondite theory of its truth, than that if I did fall off my horse and hurt my shoulder on the day mentioned, it is true, & false if I did not. But when the proposition stated is such, for instance, as the following, The three angles of any rectilineal triangle are together equal to two right angles, The doctrine of unlimited obedience to all persons in authority is mischievous and immoral, It is the duty of every one to practise beneficence, temperance, and fortitude;—it is by no means so easy, as in the simple case before supposed, to perceive clearly and precisely at first sight, what we mean by calling this a Truth; what matter of fact is really asserted; what is the immediate object of belief in this proposition. Propositions, however, of this Kind, compose some of the most important classes of truths which are the subject of human thought. In an en-

[**Opposite this passage appears the following note in JSM's hand:* All this part requires to be rewritten. *The consequent rewriting, from the preceding paragraph to the end of the chapter, resulted in the final* Chap. i *(incorporating the material above indicated as equivalent to* §2*) and also* Chap. ii, §1.]

quiry having for its object to ascertain in what manner the mind proceeds in arriving at these truths, or in satisfying itself that they are truths, it is indispensable to know what distinct matter of fact the propositions assert, and of what kind of truth such facts are susceptible. It is therefore necessary to inquire what is required to constitute a matter of fact, capable of being the subject of affirmation or denial; how many kinds of matters of fact there are, and what each is found to resolve itself into, when analysed into its simple elements; and how far the nature of the matter of fact asserted, can be collected from the form of the proposition. These are the first great problems of Logic, in its speculative branch; of Logic considered as a Science, contradistinguished from Logic considered as an Art. And I believe it will be found that when these problems are solved, all the remaining difficulties of the Science are singularly smoothed down.

There is a proposition, wherever there are a predicate & a subject: anything which is affirmed or denied, and anything which it is affirmed or denied of. But there may be a subject and a predicate wherever there are *two names*. The field of affirmation and denial, or, to speak technically, the field of Predication, is coextensive, therefore, with that of naming. Any two names, are capable of being affirmed or [*]denied of each other; and either the affirmation or the negation will be the expression of an actual Truth. The converse moreover holds: for every Truth, and whatever is believed as Truth, can be expressed in words, by coupling together two names so as to form an affirmative or a negative Proposition. It would therefore be a great step towards ascertaining what constitutes a Truth, if we could ascertain the signification of all Names.

There are consequently two modes of enquiring into the nature and varieties of Matters-of-fact. We may commence our enquiry with Things, or we may commence it with Names. We may take a survey of the field of Thought, observe what *things*, or *entities*, it includes, and attempt an analysis and classification of those entities; or we may examine all the different kinds of *names*, and by ascertaining what they respectively signify, ascertain what are all the Things which mankind have hitherto found inducements to name.

Neither of these modes of proceeding has been neglected by logicians. The classification of names is the subject of the introductory chapters in most of their elementary works, & of the doctrine of the *Predicables*. The classification of *things* is attempted in their doctrine of the *Predicaments*. On both subjects they [have] done something, and have left much undone. Profiting by what they have done, and doing what we can to supply their omissions, we shall endeavour, like them, to unite both the above methods.

[**The rest of this sentence, and the following five sentences, which are added on the opposite verso in JSM's hand, replace the following cancelled passage:* denied of each other; (and either the affirmation or the negation must be true). The converse, moreover, holds; for all mental negations and affirmations may be expressed in words. It would therefore be a great step towards ascertaining what constitutes a matter of fact capable of being asserted in a proposition, if we could determine how many Kinds of things there are capable of receiving names. For determining this there are two ways. In the first place, we may examine all the different Kinds of names, and ascertain what they respectively signify. In this way we should find out, at least, all the Kinds of things which have had names given to them hitherto. The other way is this. All things are capable of receiving names which are capable of being thought of separately. We might, therefore, take a survey of the field of thought, observe what things or *entities* it includes (we say entities to avoid an ambiguity of the word thing) and attempt a classification of those entities.]

In the order of nature, things, of course, exist before their names: and as those who first imposed names had no names to guide them in the investigation of things, some may think that we ought to do as they did; and without regarding names, go at once to the things themselves. It may not be obvious to every one in what manner an analysis and classification of names, can be necessary for distinguishing the different Kinds of matters of fact.

The use, however, of enquiring into the signification of names, is, that we may be the less liable to overlook any of the things. It is from the different kinds of names which mankind have agreed in imposing, that we learn what Kinds or varieties of things they recognized. If we analyse the signification of all kinds of names; if by examining the cases in which they are employed, we can discover what they respectively serve as marks of; an enumeration and classification of nameable objects, grounded upon this analysis, will have for its basis the whole experience of mankind. There is another advantage which will be gained by proceeding in this order. It will appear hereafter that there are many more kinds of names than there are things capable of being named: and many distinctions among names, which do not answer to any distinctions among things, but only to distinctions in the manner of naming them. Now unless these anomalies of language are carefully noted and distinctly understood beforehand, they are sure to confuse and vitiate our speculations on Things. For howsoever, in looking at Things, we may endeavour to forget names, we cannot help letting ourselves be led by established language, and making words, in a manner, the index which directs us to Things. And those persons who most pique themselves upon disregarding "mere words," are often in greatest danger of being misled by them, if not protected by an accurate analysis of their meaning. Such persons, at the very moment when they most imagine themselves to be intent exclusively upon *things*, are often viewing those things solely through the fallacious medium of some familiar phraseology.

OF NAMES

[Chapter ii: Of Names]

[§2]

[¶1] Before we attempt to discriminate between the different kinds of names, we must distinguish from names of all descriptions those words which are not names, but only parts of names. Such are all particles, as *of*, *to*, *truly*, *often*; the inflected cases of nouns substantive, as *me*, *him*, *John's*; and even adjectives, as *large*, *heavy*. These words do not express anything of which something can be affirmed or denied. We cannot say, Heavy fell, or A heavy fell, Truly, or A truly, was asserted, Of, or an Of, was in the room;—unless, indeed, we are speaking of the mere words themselves, as when we say, Truly is an English word, or Heavy is an adjective: in which case, they are certainly complete names, viz: names of those particular sounds, or of those particular collections of written characters. This employment of a word, to denote the mere letters and syllables of which it is composed, was called by the Schoolmen the *suppositio materialis* of the word. In any other sense, we cannot make one of these words the subject of a proposition, unless by combining it with other words: as, a heavy *weight* fell, A truly *important fact* was asserted, a *person* of *merit* was in the room.

[¶2] Among the words which we have characterised as not names, but parts of names, we have included adjectives. An adjective, however, is capable of standing by itself as the *predicate* of a proposition. We may say, Snow is white. But *white*, in this case, is a mere abbreviation of the compound expression *white*-thing. The Greeks and Romans were permitted, by the rules of their language, to employ this ellipsis in the subject as well as in the predicate of a proposition. In English, this cannot, generally speaking, be done. We may say, The Earth is round; but we cannot say, A round is easily moved; we must say, A round object.

Whenever, in this work, we may appear to class an adjective among names, we must be understood to speak of its equivalent substantive; to use *round*, as a synonym of round object.

[¶3] Words which were not capable of being used as names, but only as parts of names, were sometimes called by the Schoolmen Syncategorematic words: from *συν* with, and *κατηγορεω*, to predicate, because it was only *with* some other word that they could be predicated. A word which could be used either as the subject or predicate of a proposition without being accompanied by any other word, the Schoolmen termed a Categorematic word. A combination of a Categorematic & a Syncategorematic word, as, "A heavy weight," they sometimes called a *mixt* word; but this seems a needless multiplication of technical expressions. A mixt term is, in the only useful sense of the word, strictly Categorematic. It belongs to the class of what have been called many-worded names.

[¶4] For, as one word is frequently not a name, but only part of a name, so a number of words taken together often compose one single name, & no more. Thus, in the opening of the Paradise Lost, these words—

the fruit
Of that forbidden tree, whose mortal taste
Brought death into the world, & all our woe,
With loss of Eden, till one greater Man
Restore us, & regain the blissful seat

form in the estimation of the logician only one name: one Categorematic word. A method of knowing whether any set of words makes only one name, or more than one, is by predicating something of it, and observing whether, by this predication, we make only one assertion or several. Thus, when we say, John, who is the father of Thomas, came to us; we make but one assertion; whence it appears that "John, who is the father of Thomas" is no more than one name. It is true, that in this proposition besides asserting that John came to us, we also assert that John is the father of Thomas. But this last assertion was already made; we did not make it by adding the predicate "came to us." Suppose, however, that the words had been "John, *and* the father of Thomas," they would have formed two names instead of one: for when we say, John and the father of Thomas came to us, we make two assertions; one, that John came to us; the other, that the father of Thomas came to us.

[¶5] This is as much as it seems necessary to say at present in illustration of many-worded names. We now proceed to state the distinctions which have been established among names, not according to the number of words they are composed of, but according to their signification.

[§3]

[¶3] The first grand division of names is into *general*, and *individual* or *singular*. A general name is familiarly defined, a name which is capable of being truly affirmed, in the same sense, of each of an indefinite number of things. An individual or singular name is a name which is only capable of being truly affirmed, in the same sense, of one thing.

[¶4] Thus, *man* is capable of being truly affirmed of John, Peter, Thomas, and other persons without any assignable limit: and it is affirmed of all of them in the same sense: for the word *man* expresses certain qualities, and when we predicate it of those persons, we make known that they all possess those qualities. But *John*, is only capable of being truly affirmed of one single person, at least in the same sense. For although there may be many persons who bear that name, it is not conferred upon them to indicate any qualities, or anything else which belongs to them in common; and cannot be said to be affirmed of them in any *sense* at all, consequently not in the *same* sense.

"The present King of England," is also an individual name. For, that there never can be more than one person of whom it can be truly affirmed, is implied in the meaning of the words.

[¶5] It is not uncommon, by way of explaining what is meant by a general name, to say that it is the name of a *class*. But this, though a convenient mode of expression for some purposes, is objectionable as a definition, since it explains the clearer by the more obscure. It would be more proper to give as the definition of "a class," that it means the indefinite multitude of individuals, denoted by a general name.

[¶6] It is necessary to distinguish *general* from *collective* names. A general name is one which can be predicated of *each* individual of a multitude; a collective name cannot be predicated of each separately, but only of all taken together. Thus, "the 76th Regiment of Foot," which is a collective name, is not a general, but an individual name; for although it can be predicated of a multitude of individual soldiers, taken jointly, it cannot be predicated of them taken severally. We may say, Peter is a soldier, and John is a soldier, and Thomas is a soldier, but

we cannot say, Peter is the 76th Regiment, and John is the 76th Regiment, and Thomas is the 76th Regiment. We can only say, Peter, and John, and Thomas, and James, and so forth, (enumerating all the soldiers) are the 76th Regiment.

[¶7] "The 76th Regiment" is a collective name, but not a general one: "A regiment" is both a collective & general one: general, as respects all individual regiments, of each of which separately it can be affirmed; collective, as respects the individual soldiers, of whom each regiment is composed.

[§4]

[¶1] The next general division of names is into *concrete & abstract*. A concrete name is a name which stands for a thing, an abstract name is a name which stands for an attribute of a thing. Thus, *John*, *man*, *white* are names of things; *whiteness*, is the name of an attribute of a thing. We have already observed that *white*, though otherwise a mere Syncategorematic word, is properly a name when used by way of ellipsis for the compound expression *white-thing*.

[¶2] I have used the words concrete and abstract in the sense attached to them by the Schoolmen, who, notwithstanding the imperfection of their metaphysics were unrivalled in the construction of technical language, and whose definitions, I conceive, have seldom been altered but to be spoiled. A practice, however, has grown up in more modern times, which, if not introduced by Locke, has gained currency chiefly by his example, of applying the expression "abstract name" to all names which are the result of abstraction or generalization, consequently to all general names, instead of confining it to the names of attributes. The philosophers of the Condillac School, whose admiration of Locke, passing over the profoundest speculations of that truly original genius, usually fastened with peculiar eagerness upon his weakest points, have gone on imitating him in this abuse of language until there is now some difficulty in restoring the word to its original signification. A more wanton alteration in the meaning of a word is rarely to be met with; for the expression *general name*, the exact equivalent to which exists in all languages with which I am acquainted, was already available for the purpose to which *abstract* has been misappropriated, while the misappropriation has left that important class of words, the names of attributes, without any compact distinctive appellation. The old acceptation however, has not gone so completely out of use, as to deprive those who now adopt it of all chance of being understood. By *abstract*, then, I shall always mean, the opposite of *concrete*; by an abstract name, the name of an attribute; by a concrete name, the name of an object.

[¶3] [*]Do abstract names belong to the class of general, or to that of singular, names? Those which are names of *single* attributes, belong properly to neither one nor the other: for instance, *visibleness*; *tangibleness*; *equality*; *squareness*; *milkwhiteness*. These cannot in strictness be called general names, for none of them is the name of a class, comprising individuals *in* it: we cannot call the squareness of the square ABCD, the squareness of the square EFGH, & so forth, individuals. Yet neither can any abstract name be called singular; for if it be not a name of many individuals, as little is it the name of one individual. They must

[**The next two paragraphs, added in JSM's hand on the opposite verso, replace the cancelled passage given at* p. 979n *below.*]

be placed in a class apart. There is, however, a kind of abstract names which are indisputably general; they are those which are names not of one attribute but of a class of attributes. Such is the word *colour*, which is a name of whiteness, redness, &c. Such is the word *whiteness*, in virtue of the various *shades* of whiteness to which it is applied in common; the words *magnitude*, *weight*, & the like, in virtue of the various *degrees* of magnitude & weight. Such also is the word *attribute* itself, the common name of all particular attributes.

[*]We must be careful not to confound names of attributes with one important class of concrete names, names of sensations. Our sensations seldom receive separate names. We have a name for the object which gives us a certain sensation: the name *white*. We have also a name for the quality in the object, to which we ascribe that sensation; the name *whiteness*. But when we wish to speak of the sensation itself, we must use a circumlocution, & say, *the sensation of white*, or *the sensation of whiteness*. We have no name which expresses the sensation itself, simply; existing, as it might easily be conceived to exist, without any object to excite it. In the case of our sensations of hearing, we are more fortunate: we have the word *sound*, & a whole vocabulary of words to denote the various kinds of sound. For, as we oftener have these sensations in the absence of any *perceptible* object, we can more easily conceive having them in the absence of any object whatever. But in most instances, we have no name peculiarly appropriated to the sensation: and in that case the same name denotes indiscriminately the attribute, & the sensation. Thus *colour* stands for sensations of sight, as well as for the quality in the coloured object. *Virtue* denotes not only the quality of being a virtuous person, but also the virtuous acts themselves: as when we speak of living in the *practice* of virtue. We must bear in mind therefore, that whenever the word commonly denoting an attribute, is taken to express the sensation or sensible phenomenon which is called the effect or manifestation of the attribute, it then ceases to be an abstract name, & becomes concrete. Attention to this remark will save much confusion.

[¶4] It may be objected, that not only abstract names, but adjectives, which I have placed in the concrete class, are names of attributes: that *white*, for example, is as much the name of the colour, as *whiteness* is. To this the answer is, that *white* is not the name of the colour, but of the thing having the colour. The word white may be predicated of snow, or milk or linen; we may say, Snow is white, Milk is white, Linen is white: but we cannot say, Whiteness is white. White, therefore, is not a name of the quality whiteness, but of every white object. It is true this name was given to the objects on account of that colour; and we may therefore say, without impropriety, that the quality forms part of its signification; but not, that white is the name of the quality. A name can only be correctly said to stand for, or to be a name of, those things of which it can be predicated. All names, except those which are mere unmeaning marks, put upon individuals for the purpose of distinguishing them when they occur in discourse; all names which can be said to have any signification; all names by applying which to an individual we communicate any information respecting that individual,—may be said to *imply* an attribute of some sort; but they are not names of the attribute; and the attribute has its own proper name besides. This leads us to the consideration of

[**The following paragraph disappeared in the rewriting.*]

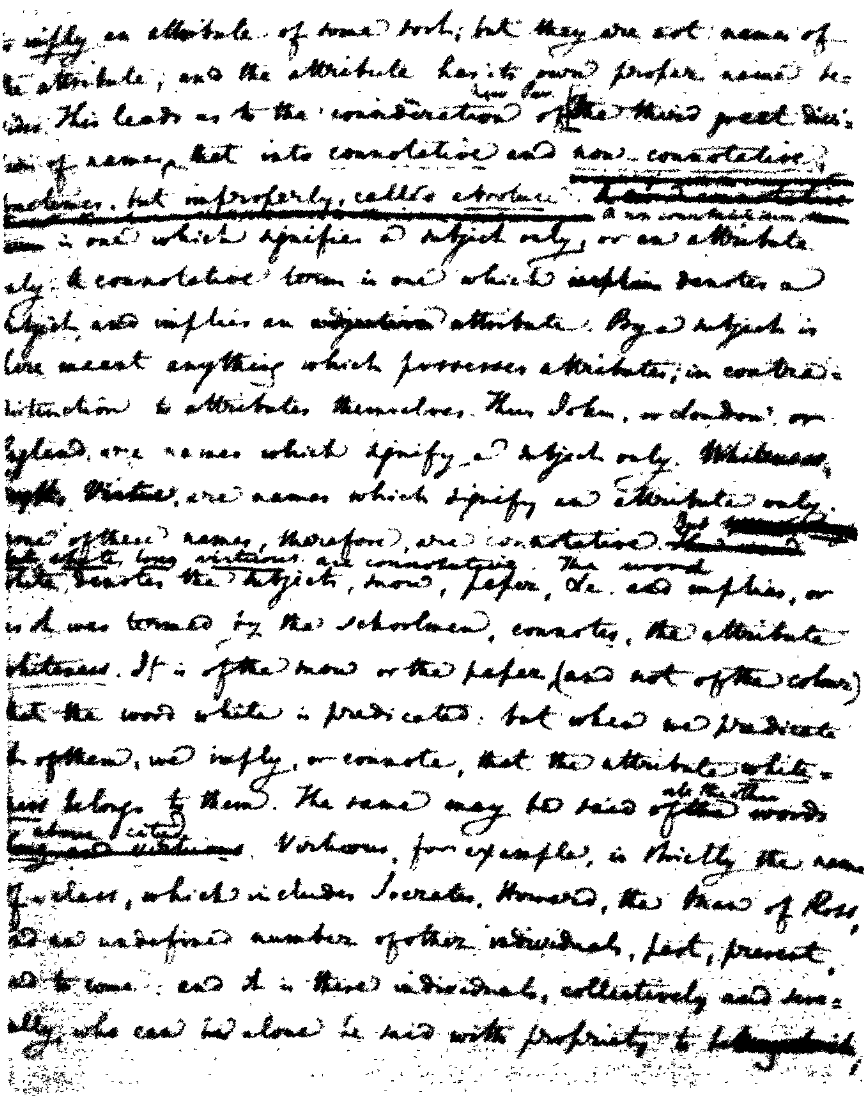
[§5]

[¶1] The third great division of names, that into *connotative* and *non-connotative*, sometimes, but improperly, called *absolute*. [¶2*] A non-connotative term is one which signifies a subject only, or an attribute only. A connotative term is one which denotes a subject, and implies an attribute. By a subject is here meant anything which possesses attributes; in contradistinction to attributes themselves. Thus John, or London, or England, are names which signify a subject only. Whiteness, Length, Virtue, are names which signify an attribute only. None of these names, therefore, are connotative. But *white*, *long*, *virtuous*, are connotative. The word white, denotes the subjects, snow, paper, &c. and implies, or as it was termed by the Schoolmen, *connotes*, the attribute *whiteness*. It is of the snow or the paper, (and not of the colour) that the word white is predicated: but when we predicate it of them, we imply, or connote, that the attribute *whiteness* belongs to them. The same may be said of all the other words above cited. Virtuous, for example, is strictly the name of a class, which includes Socrates, Howard, the Man of Ross, and an undefined number of other individuals, past, present, and to come: and it is these individuals, collectively and severally, who can alone be said with propriety to be denoted by it; of whom, alone, it can be properly said to be the name. But it is a name imposed upon them all in consequence of a certain attribute which they possess in common, namely, that of virtue. It is imposed upon all beings that are believed to possess this attribute; and it is not imposed on any which are not believed to possess it.

[¶3] All concrete general names which are names of substances, are connotative. The word *man*, for example, denotes John, Thomas, and an indefinite number of other individuals, of whom, taken as a class, it is the name. But it is applied to them because they possess, & to signify that they possess, certain attributes. These seem to be, corporeity, animal life, rationality, and a certain external form, which, for distinction, we call the human. Every existing thing, which possessed all these attributes, would be called a man; and anything which possessed none of them, or only one, or two, or even three of them without the fourth, would not be so called. For example, if in the interior of Africa were to be discovered a race of animals, possessing reason equal to that of man, but with the form of an elephant, they would not be called men. Swift's Houyhnhms [*sic*] were not so called. Or if such newly discovered beings possessed the form of man without his reason, it is probable that some other name than that of man would be found for them. The word *man*, therefore, signifies all these attributes, and all subjects which possess those attributes. But it can be predicated only of the subjects. It is said, therefore, to signify the subjects directly, and the attributes indirectly; it denotes the subjects, and implies, or involves, or indicates, or *connotes* (as the Schoolmen most aptly termed it) the attributes. It is a connotative name.*

[**Here JSM cancelled the first three words of the next sentence, interlined and then cancelled the following sentence:* We shall begin with the common notion of this distinction, which we shall find reason to alter in some respects as we go on. *He then interlined the three words he had earlier cancelled.*]

*[¶4] Connotative names are aso called by Logicians *Denominative*; because they denote a subject denominated by an attribute, or deriving its name from one. Thus, *white* denotes the subjects snow, silver, &c. by reason of their possessing in common a certain attribute (which we express by the name *whiteness*). The attribute whiteness, therefore, may be said to denominate these objects; or to give to them their common name. [*This*



imply an attribute of some sort; but they are not names of the attribute; and the attribute has its own proper name besides. This leads us to the consideration of the third great division of names, that into connotative and non-connotative, sometimes, but improperly, called absolute. A non-connotative term is one which signifies a subject only, or an attribute only. A connotative term is one which denotes a subject, and implies an attribute. By a subject is here meant anything which possesses attributes; in contradistinction to attributes themselves. Thus John, or London, or England, are names which signify a subject only. Whiteness, length, virtue, are names which signify an attribute only. None of these names, therefore, are connotative. But white, long, virtuous, are connotative. The word white, denotes the subjects, snow, paper, &c. and implies, or as it was termed by the schoolmen, connotes, the attribute whiteness. It is of the snow or the paper (and not of the colour) that the word white is predicated: but when we predicate it of them, we imply, or connote, that the attribute white- ness belongs to them. The same may be said of all the other words above cited. Virtuous, for example, is strictly the name of a class, which includes Socrates, Howard, the Man of Ross, and an undefined number of other individuals, past, present, and to come; and it is these individuals, collectively and severally, who can alone be said with propriety to belong

Folio from the Early Draft in Scribe A's hand, with Mill's emendations
Pierpont Morgan Library

[¶6] Those names of substances which are names of individuals, require separate consideration.

[¶7] *Proper* names are not connotative. They denote the individuals who bear them; but they do not indicate or imply any attributes belonging to these individuals. When a man Christens his child by the name Thomas, or names his dog by the name Cæsar, those names are simply marks used to enable those individuals to be made subjects of discourse. It may be said that he had some reason for giving them those names rather than any others. It may be so; but the name gives no intimation of that reason. A man may be called [*]John, because that was the name of his father; a town may be called Dartmouth, because it is situated at the mouth of the Dart. But it is no part of the signification of the word John, that the father of the person in question bore the same name; nor even of the word Dartmouth, to be situated at the mouth of the Dart. For if sand should choke up the mouth of that river, or an earth quake change its course, so that the town should no longer be situate upon it, there is no reason to suppose that the name of the town should be changed. That fact, therefore, can form no part of the signification of the word; for, otherwise, when the fact ceased to be true, the name would cease to be applied. Proper names are attached to the objects themselves, and not to the continuence of any attribute of the object.

[¶8] But there is another class of names, which, although they are individual names, that is, predicable only of one object, are really connotative. Such is the name which we have already once used as an example, "The present King of England."

For, although we may give to an individual a name utterly unmeaning, which we call a proper name; a word which answers the purpose of shewing what thing it is we are talking about, but not of telling anything about it; yet a name peculiar to an individual is not necessarily of this description. It may be significant of some attribute, or some union of attributes, which, not being possessed by any but one object, determines the name exclusively to that individual. "The sun" is a name of this description. "God" is another. These, however, are scarcely examples of what it is our present object to illustrate, being, in strictness of language, general and not individual names: for although they are, *in fact*, predicable only of one object, there is nothing in the meaning of the words themselves which implies this: and accordingly when we are imagining and not affirming, we may speak of many suns, and the majority of mankind have believed and still believe that there are many gods. But it is easy to produce words which are real instances of connotative individual names. It may be part of the signification of the connotative name itself, that there exists but one individual possessing the attribute which it connotes: as for instance, "the *only*

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note appears verso, opposite the following cancelled passage, the substance of which appears at pp. 976–7 *above (see* p. 976n*):* Even abstract names are sometimes connotative; for even an attribute may, without impropriety, be said to have attributes; & may therefore have a name given to it which shall connote those attributes. Abstract names are of two kinds: some are names of single attributes, others are names of classes of attributes: the former are not connotative, the latter are. Thus, *whiteness*, which is the name of one indivisible attribute, connotes nothing: but *colour*, which is the name of whiteness, blackness, redness, and many other attributes, connotes the particulars in which they all agree: viz: a certain *resemblance* to one another, & the circumstance of being perceived through the eye.]

[**Gathering* C *begins here.*]

son of John Stiles:" "the *first* Emperor of Rome." Or the attribute connoted may be a connexion with some individual event, (by which I mean not an event *of a particular kind*, but one actual determinate event, which is past and over): and the connexion with that event may be of such a kind as only one individual could have; or without being this, it may be such as only one individual actually had, and this may be implied in the form of the expression. "The father of Socrates" is an example of the one kind, (since Socrates could not have had two fathers); "The author of the Iliad;" "The murderer of Henri Quatre," of the second. For although it is conceivable that more persons than one might have participated in the authorship of the Iliad or in the murder of Henri Quatre, the employment of the article *the* implies that this was not the case. What is here done by the word *the*, is done in other cases by the context: thus, "Cæsar's army" is an individual name, if it appears from the context that the army meant is that which Cæsar commanded in a particular battle. The name, being a many-worded name, may consist, in the first place, of a general name, capable, therefore, in itself, of being affirmed of more than one thing, but so limited by other words joined with it, that the entire expression can only be predicated of one object, consistently with the meaning of the general term. This is exemplified in the instance so often cited, "The present King of England." King of England is a general term: the attributes which it connotes may be possessed by an indefinite number of persons: in succession, however, not simultaneously, since the meaning of the word imports (among other things) that there can be only one King of England at a time. This being the case, and the application of the name being afterwards limited by the word *present*, to such individuals as possess the attributes at one indivisible point of time, it becomes applicable only to one individual. And this appearing from the meaning of the word, without any extrinsic proof, it is strictly an individual name.

[¶9] From the above particulars it will be easily perceived, that whenever names of substances have properly any meaning, the meaning resides not in what they denote but in what they connote. The only names of substances which connote nothing are *proper* names; and these have in reality no signification.

[¶10] If, like the robber in the Arabian Nights, we make a mark with chalk upon a house to enable us to know it again, the mark has a purpose, but it has not properly any meaning. The chalk does not say, This is my house, or This is the house which I mean to rob. The object of making the mark is merely distinction. I say to myself, All these houses are so exactly alike, that if I once lose sight of them I shall not again be able to distinguish that which I am now looking at, from any of the others. I must therefore contrive to make the appearance of this one house unlike that of the others, that I may hereafter know, when I see the mark,—not, indeed, any attribute of the house—but simply that it is the same house which I am now looking at, and wish to be able to recognize again. Morgiana chalked all the other houses in a similar manner, & defeated the scheme: how? Simply by obliterating the difference of appearance between that house & the others. The chalk was then no longer of any use for the purpose of distinction, & not serving that purpose, it served no other.

[¶11] When we impose a proper name, we perform an operation in some degree analogous to what the robber intended in chalking the house. A proper name, so far as respects ourselves (for of its uses in communicating with others we have not here to speak), is merely an unmeaning mark, which we do not, indeed, inscribe upon the object itself, but which we endeavour to connect with

the idea of the object in our minds, in order that whenever the mark meets our eyes or occurs to our thoughts, we may think of that individual object. Not being attached to the thing itself, it does not enable us as the chalk does, to distinguish the object when we see it; but it enables us to distinguish it when it is spoken of, either in the records of our own experience or in the discourse of others: to know that what we find asserted in any proposition of which it is the subject, is asserted of that individual object with which we are already acquainted.

[¶12] Objects thus ticketed with proper names, resemble, until we know something else about them, men & women in masks. We can distinguish them from one another, but can conjecture nothing with respect to their real features. It is otherwise with objects which are spoken of by connotative names. Such names are not signs of the mere objects, invented because we have occasion to think and speak of these objects individually; but signs which accompany an attribute, a kind of livery in which the attribute clothes all objects which are discovered to be endowed with it. They are not mere marks, but more, that is to say, significant marks: and it is the connotation which constitutes their signification.

[¶13] A proper name, which connotes nothing, but which denotes an individual, is called the name of that individual. The importance of adhering to analogy in the employment of words, requires us in like manner to say that a connotative word is the *name* of what it *denotes*, not of what it *connotes*. But by knowing what thing it is the name of, we do not know the meaning of the name: for to the same thing we may often with propriety apply many names; which are not on that occasion equivalent in meaning. Thus, I call a certain man by the name Sophroniscus: I call him by another name, "the father of Socrates." Both these names are names of the same object, the same individual human being; but their meaning is altogether different, because they are applied to that individual for two different purposes; the one, merely to distinguish him from other persons who are spoken of; the other to indicate a particular fact relating to him, viz: the fact that Socrates was his son. I also apply to him these other expressions: a man, a Greek, an Athenian, a stone-cutter, an old man, an honest man, a brave man. All these are names of Sophroniscus, not indeed of him alone, but of him and each of an indefinite number of other human beings. Each of these names is applied to Sophroniscus for a different reason, and each, if I understand its meaning, informs me of a distinct fact or number of facts concerning him. I might be informed that each of these names was applicable to Sophroniscus, and might yet not know what they respectively signified with regard to him. It is even conceivable that I might know every single individual of whom the name could be with truth affirmed, and yet could not be said to know the meaning of the name. A child knows who are its brothers & sisters, long before it has any definite conception of the nature of the fact which is involved in the signification of those terms.

[¶14*] In some cases it is not easy to decide with certainty, how much a particular word does or does not connote; that is, we do not exactly know (the case not having arisen) what degree of difference in the object would occasion a difference in the name. Thus, it is clear that the word *man*, besides animal life and rationality, connotes also a certain form; but it would be impossible to say precisely *what* form; that is, to decide how great a deviation from the form ordinarily found in the beings whom we are accustomed to call men, would

[**This paragraph was added in JSM's hand on the opposite verso.*]

suffice in a newly discovered race to make us refuse them the name of man. In all such cases, the meaning of the general name is so far unsettled and vague. In the particular case in question, the vagueness is of no practical moment, because it does not occasion any variableness or doubt as to the applicability of the name to any objects which actually exist, nor any material uncertainty as to what we mean to predicate when we apply it to such. But there are innumerable cases in which a vague connotation is a most serious evil.

[¶15] One of the chief sources indeed, of lax habits of thought, is the custom of resting satisfied without any more precise notion of the meaning of connotative terms, than can be loosely collected from observing what objects they are used to *de*note. It is in this manner that all of us acquire and inevitably so, our first knowledge of our vernacular language. A child learns the meaning of the words *man* or *white*, by hearing them applied to a variety of individual objects, and finding out by a process of generalization and analysis of which he is but imperfectly conscious, what these different objects have in common. In the case of these two words the process is so easy as to require no assistance from culture; the objects called men, and the objects called white, differing from all others by qualities of a peculiarly definite and obvious character. But in many other cases, objects bear a general resemblance to one another, which leads to their being familiarly classed together under a common name, while, without more analytic habits than the generality of mankind possess, it is not immediately apparent what are the particular attributes, upon the possession of which in common by them all, this general resemblance depends. When this is the case men use the name without any recognized connotation, that is, without any precise meaning: they talk, and consequently think, vaguely: and remain contented to attach only the same degree of significance to their own words, which a child of three years old attaches to the words, brother and sister. The child at least is seldom puzzled by the starting up of new individuals having pretensions to be his brothers and sisters, and whom he knows not whether so to denominate; because there is usually an authority at hand to solve all doubts, whose infallibility on such points is unquestionable. But a similar resource does not exist in other cases, and new objects are constantly presenting themselves to men, women, and children, which they are called upon to class *proprio motu*. They accordingly do this on no other principle than that of superficial similarity, giving to each new object the name of that familiar object the idea of which it most readily recals, or which, on a cursory inspection, it appears to them most to resemble. In this manner, a name which was originally appropriated to A, becomes communicated to B, then extended to C, then to D, each time, by reason of a gross and general resemblance to some only of the things which it previously denoted, until all traces of a common meaning sometimes disappear, and the word comes to denote a number of things not only independently of any common attribute, but which have actually no attribute in common, or none but what is shared by other things to which the name is capriciously refused. Even philosophers have frequently aided in this perversion of general language from its purpose, sometimes because, like the vulgar, they knew no better; and sometimes in deference to that aversion to admit new words, which induces mankind, on certain subjects, to attempt to make the original small stock of names serve with but few additions to express a constantly encreasing number of objects and distinctions, and consequently to express them in a manner progressively more and more imperfect.

¶

[¶16] The manifold evils consequent upon this loose mode of classing and denominating objects will be further particularized and illustrated in that portion of the present work which will treat of Classification. To what a degree it has rendered almost the whole vocabulary of the mental and moral sciences, unfit for the purposes of accurate thinking is best known to him who has most reflected on the present condition of those Sciences. In the meanwhile it may here be observed that since the introduction of a new technical language as the vehicle of speculations on moral subjects would not be tolerated, and if tolerated would deprive those subjects of the benefit of the habitual feelings which have grown round the established terms and the established groups, and which would not for a long time take an equally strong hold of new ones; the problem for the philosopher, & one of the most difficult ones which he has to resolve, is, in retaining the existing nomenclature, how best to alleviate its vices. This can only be accomplished by giving to every general concrete name a definite and fixed connotation; in order that it may be known what attributes, when we call an object by that name, we really mean to predicate of the object. And the question of most nicety is, how to give this fixed connotation to a name, with the least possible change in the objects which the name is habitually employed to *de*note; with the least possible disarrangement (either by addition or subtraction) of that group of objects which it names, in however imperfect a manner, the circumscribe and hold together [*sic*]: and with the least possible vitiation of the truth of any propositions, which are commonly received as true.

[¶17] This desirable purpose of giving a fixed connotation where it is wanting, is the end aimed at whenever any person attempts to give a *definition* of a general name already in use. And the fact that no questions which have arisen in the moral sciences, have been subjects of keener controversy than the *definitions* of almost all the leading expressions, is a proof to how great a length the evil above adverted to has proceeded: every definition of a connotative name being an attempt either merely to declare, or to declare & analyse, the connotation of that name. What are the conditions which such an attempt ought to conform to, in order to be most useful, is a question that has not yet received from logicians all the attention which it seems to merit, and which will be bestowed on it in a subsequent part of the present work.

[¶18] When it is found in attempting to define any word, that no definition can be framed which will be true of all the objects which the word is used to denote; that therefore no one connotation which can be given to it, will allow of its continuing to denote all those objects; it may perhaps be found that the word is *ambiguous*, or, in other words, that by giving it two, or more than two separate and distinct connotations, the objects may all be brought within it. The word will then have several meanings, but all of them fixed and recognized ones; and the paucity of existing names, in comparison with the demand for them, may often render it advisable to retain the name in this multiplicity of acceptations, distinguishing these so clearly as to prevent their being confounded in future. But it will be found almost as frequently, that neither in one nor in any moderate number of fixed meanings, can the word be made truly predicable of all the objects of which it is customarily predicated. In such a case there remains no alternative, except either to do without the word altogether, or to define it in such a manner as to leave out some of the things of which it is commonly used as a name: under the disadvantage that in forbidding it to be henceforth predi-

cated of those objects, and asserting such predications to be false, you appear to persons of illogical habits as if you asserted a paradox, when you are only mending a tool.

[*]Thus far, in considering connotative terms, we have confined our attention to names of substances. There are two classes of names which still remain to be considered, the names of sensations, and other feelings; & the names of attributes.

All names of feelings are connotative. If, indeed, we ever gave a distinguishing name to one single feeling, to the passing sensation of an instant, the name would, like a proper name, connote nothing: there would be nothing for it to connote. But all names of sensations are names of *classes* of sensations; mostly indeed of classes very heterogeneous in their composition; as *sound*; *taste*; *sweet taste*; *bitter taste*; *hope*; *fear*; *pleasure*; *pain*. Even if all the sensations which enter into the class were exactly alike; if for instance we had a name to denote the exact colour of newfallen snow, & no other colour at all; still being a name common to all the sensations we have during our whole life, of that exact kind, it would be connotative; it would *de*note the particular sensations, & connote the *kind*; that is, would connote their resemblance to each other: When predicated of a present sensation, it would denote that sensation, & connote its resemblance to all the sensations we had ever had before, which were called by that name.

We have arrived, therefore, at the conclusion, that all concrete general names are connotative: whether they be names of classes of substances, or names of classes of feelings.

Abstract names for the most part are not connotative. It may be said, indeed, that they are connotative in the same manner in which names of classes of feelings are so: that *whiteness*, for instance, denotes the whiteness of the snow of today, the whiteness of the snow of yesterday, &c. and connotes their resemblance. I answer, no: The two whitenesses may indeed without impropriety be said to resemble: but when we use the word *whiteness*, we are not thinking of the resemblance of the attributes, but of the resemblance of the sensations. When I say, "Whiteness is a quality of this snow," I am not thinking of former snow & its quality of whiteness, but of former sensations of white: The whiteness which I affirm to be an attribute of this snow, may be defined, the quality of giving me sensations similar to those former ones. What is involved, then, in the signification of the word whiteness, is not the resemblance of one whiteness to another whiteness, but of one sensation of white to another sensation of white: & it is involved not as a connotation, but as part of the denotation. The abstract name *whiteness* does not denote the attribute & connote the resemblance, as the concrete word *white* denotes the object & connotes the quality. The quality is something distinct from the object; but the resemblance is not something distinct from the attribute; it is the very meaning of the attribute; & when we have said that the abstract name signifies the attribute, we have said all that it signifies.

[¶5] Nevertheless, there are abstract names which are strictly connotative; names which denote attributes, & connote an attribute of those attributes. Such, for instance, is the word *fault*; equivalent to *bad* or *hurtful quality*. This word is a name common to many attributes, & connotes hurtfulness, which is an attribute not of the mere fact or phenomenon, but strictly of the attributes themselves. When for example we say that slowness, in a horse, is a fault, we do not

[**The following four paragraphs disappeared in the rewriting of this and the next chapter; these, and the next paragraph, were added in JSM's hand on the opposite verso.*]

mean that the slow movement is in itself hurtful; we mean that the property or peculiarity in a horse, of being a slow mover, is so.

[¶18,n] We may now quit the subject of connotative names. Before doing so, however, it is proper to observe, that the only modern writer, who, to my knowledge, has adopted from the Schoolmen the word to *connote*, has employed it in a signification different from that which is here given to it. The writer to whom I allude is Mr. Mill, in his Analysis of the Phenomena of the Human Mind. He seems to use the word in a sense coextensive with its etymology, applying it to any case in which a name, while it seems to point most directly to one thing, which is consequently termed its signification, includes at the same time a tacit reference to some other thing. In the case which we have had under consideration, that of the signification of concrete general names, Mr. Mill's language is the direct converse of mine. Agreeing with me in considering the signification of the word to lie in the attribute, he speaks of the word as *connoting* not the attribute, but the thing possessing the attribute. And he describes abstract names as being properly concrete names with their connotation dropt; whereas in my view it is the *denotation* which should be said to be dropped, that which was previously connoted becoming now the whole signification.

My reason for preferring my own phraseology was the urgent necessity of a term to be appropriated exclusively to express the peculiar manner in which a concrete general name serves to mark the attributes which are involved in its signification. This necessity can scarcely be felt in its full force by any one, who has not gone through the whole labour of thought which has been necessary for writing this work. I think it is scarcely an exaggeration to say that some of the most prevalent of the errors which have been committed in the Philosophy of Logic, would in all probability have been avoided if a term had been in common use to express exactly what I have signified by the word *to connote*. And the Schoolmen, to whom we are indebted for all the rest of our logical language, gave us this also, and in this very sense. For although some of their general expressions afford a colour for using this word in the more extensive and vaguer acceptation in which it is taken by Mr. Mill, yet when they came to define it specifically, and to fix its meaning with that admirable precision which always characterised their definitions, they clearly explained, that nothing was said to be connoted except *forms*, which word may generally, in their writings, be understood as synonymous with *attributes*.

Now, if the word *to connote*, so well suited to the purpose to which they applied it, be diverted from that purpose by being taken to fulfil another for which it does not seem to me to be at all required; I am unable to find any expression to replace it but such as are commonly employed in a sense so much more general, that it would be useless attempting to associate them peculiarly with this precise idea. Such are the words, to involve, to imply, &c. By employing these I should fail of attaining the object, for which alone there is occasion for the name at all, namely to *distinguish* this particular kind of involving or implying from all other kinds, & to assure to it the degree of habitual attention which its importance demands.

[§6]

[¶1] The fourth great division of names is into *positive* and *negative*. Positive, as *man*, *stone*, *good*; negative, as *not-man*, *not-stone*, *not-good*. For every positive

concrete name, a corresponding negative one might be framed. After giving a name to any one thing or to any plurality of things, we might create a second name which should be a name of all other things except that particular thing or things. These negative names might be usefully employed whenever we had occasion to speak collectively of all things other than some thing or class of things. When the positive name is connotative, the corresponding negative name is connotative likewise, but in a peculiar way, connoting not the presence but the absence of an attribute. Thus, *not-white*, denotes all things whatever except white things; and it connotes that they do *not* possess the attribute whiteness.

The non-possession of any given attribute, may itself without impropriety be called an attribute: that attribute may receive a name; and thus negative concrete names will obtain negative abstract names to correspond to them.

[¶2] Names which are positive in form, are often negative in reality, and others are really positive though their form is negative. The word *inconvenient*, for example, does not express the mere absence of convenience; it expresses a positive attribute, which consists in being the cause of actual pain or mischief. The same may be said of the word *unpleasant*, which, notwithstanding its negative form, does not connote the mere absence of pleasantness, but a less degree of what is signified by the word *painful*, which will be admitted to be as positive in its signification as any other. The word *idle*, on the other hand, though positive in its form, expresses nothing but what would be signified either by the word *not-working*, or by the word *not disposed to work*; and *sober*, either *not-drunk* or *not-drunken*.

[¶3] There is a class of names called *privative*. A privative name is equivalent in its signification to a positive and a negative name taken together; being the name of something which has once had a particular attribute, or for some other reason might have been expected to have it, but which has it not. Such is the word *blind*, which is not equivalent to not-seeing; for it would not, except by a poetical or rhetorical figure, be applied to a stone or to a tree. A thing is not said to be blind, unless the class to which it is most familiarly referred, be chiefly composed of things which can see; as in the case of a blind man, or a blind horse; or unless it is supposed for any reason that it ought to see; as when we say of a man, that he rushed blindly into an abyss, or of philosophers or the clergy that the greater part of them are blind guides. The names called privative, therefore, connote two things: the presence of certain attributes, and the absence of others.

[§7]

[¶1] The fifth great division of names is into *relative* and *absolute*, or, to speak more precisely, *relative* and *non-relative*. [¶2] Relative names are such as *father*, *son*; *like*; *unlike*; *longer*, *shorter*; *cause*, *effect*. Their characteristic property is that they are always given in pairs. Every relative name which is predicated of an object, supposes another object of which we may predicate either that same name or another relative name which is said to be the *correlative* of the former. Thus, when we call any man, a *son*, we suppose another man who must be called a *father*. When we call any event a *cause*, we suppose another event, which is an *effect*. When we say of any distance that it is *longer*, we suppose another distance which is *shorter*. When we say of any object that it is *like*, we mean that it is like another object, and this other may also be said to be *like* the first. In this last case

the relative name is its own correlative. The pair of objects both receive the same name.

[¶3] It is evident that relative names, when concrete are, like other concrete names, connotative. They all denote a subject, and connote an attribute. It is to be observed, moreover, that although the objects *de*noted by two correlative names are different; both names connote the same attribute; or, to express the truth more accurately, what both names connote is some fact or circumstance in which both objects are alike concerned, & which, according as it is considered an attribute of the one object or of the other, gives rise to the one or to the other name.

[¶5] Thus, when we predicate of A that he is the father of B, and of B that he is the son of A, we assert the very same fact in different words. The two propositions are precisely equivalent. Neither of them asserts one tittle more or one tittle less than the other. The paternity of A and the filiation of B are not two facts, but two names for the same fact. What that fact is, every one who understands the meaning of the words, is aware. The only difference is, that the abstract term paternity is a name of the fact, considered as an attribute of A: the abstract term filiation is a name of the same fact, considered as an attribute of B.

[¶6] I said at first that both the correlative names connoted the same attribute: but, in saying this, I permitted myself a verbal inaccuracy for the advantage of a compact expression. We cannot with propriety say that paternity and filiation are one and the same attribute, otherwise to call a man father and to call him son would mean the same thing. The fact which both words, when predicated not of the same person but of two different persons, express, is, however, one and the same. And all that appears necessary, to account for the existence of relative names, is merely this, that a fact, in which two individuals are equally concerned, may be viewed & spoken of as an attribute either of one or the other, as we think fit.

[¶4] This kind of attribute is commonly called a *relation*; and has usually been regarded as something unusually recondite and mysterious. Why it should be more so than any other attribute, I am unable to conceive, seeing no greater difficulty to be encountered in a fact which respects two objects, than in a fact which respects only one. But this question, of the nature of Relation, will partly fall under our consideration in a subsequent chapter, & partly belongs to the higher metaphysics.

[¶7] For the present, and without prejudice to whatever conclusion may be come to hereafter on the subject of Relation, Relative names may be provisionally defined as follows. A name is called relative, when, in addition to the object which it denotes, it implies in its signification the existence also of another object, also deriving a denomination from the same fact which is connoted by the first name. Or, (to express the same thing in other words), a name is said to be relative, when, being the name of one thing, its signification cannot be explained but by mentioning another. Or we may state it thus: when the name cannot be employed in discourse so as to express a meaning, unless the name of some other thing than what it is itself the name of, be either expressed or understood. We may take our choice among these definitions. They are all, at bottom, equivalent; being modes of variously expressing this one distinctive circumstance, that all the other attributes of an object might be conceived, without a contradiction, still to exist, if all objects besides itself (or at any rate all except itself and the

percipient mind), were at once annihilated: But those of its attributes which are expressed by relative names, would, on that supposition, be swept away.

[§8]

[¶1] Names have been further distinguished into *univocal* and *æquivocal*: these, however, are not two kinds of names, but two different modes of employing names. A name is univocal, or applied univocally, with respect to all those things of which it can be predicated *in the same sense*: but it is æquivocal, or applied æquivocally, as respects those things of which it is predicated in different senses. It is scarcely necessary to give instances of a fact so familiar as the double meaning of a word. In reality, an æquivocal or ambiguous word, is not one name, but two names, accidentally coinciding in sound. *File* standing for an iron instrument, and *file* standing for a row of soldiers, have no more title to be considered one word, than *grease* and *Greece* have, merely because they are pronounced alike. They are one sound, appropriated to form two different words.

[¶2] An intermediate case is that of a name used *analogically* or *metaphorically*; that is, a name which is predicated of two things, not univocally or in exactly the same signification, but in significations somewhat similar, and derived one from the other; as when we speak of a brilliant jewel, and a brilliant achievement. The word is not applied in the same sense to the jewel and to the achievement; but, having been applied to the jewel in its original sense, that of brightness to the eye, it is transferred to the achievement in a derivative signification supposed to be somewhat like the primitive one. The word, however, is just as properly two names instead of one, in this case, as in that of the most complete ambiguity.

The different kinds of ambiguity or æquivocalness in names, the various disguises under which those ambiguities escape from detection, and the incorrect reasoning, incorrect generalization, and incorrect classification, of which they are the fruitful source, will be considered and illustrated in that part of the present work which treats of Fallacies.

CLASSIFICATION OF THINGS

[Chapter iii: Of the Things denoted by Names]

[§1]

[¶*1**] We have now made sufficient progress in the analysis of the meaning of names for the purpose of that portion of our enquiry in which we are at present engaged. Much more indeed is required to complete such a theory of names as may suffice to form the Scientific basis of an Art of Nomenclature. This, however, will belong to a subsequent part of the work. Our object at present is merely to analyse the import of Propositions. In the pursuit of that object, since everything which is capable of receiving a name may be made the subject or the predicate of a Proposition, we found it necessary to enter into the question, What things are there, capable of receiving names? To facilitate the enquiry, we examined what are the things signified by the existing names. And we have carried this examination sufficiently far, to enable us to turn to the contemplation of the things themselves, without incurring the danger of overlooking any class of entities, recognized by the existing nomenclature and thence making such an enumeration of things as shall leave any class of Names destitute of an appropriate meaning.

[¶2] The necessity of an enumeration of Entities as the Basis of Logic did not escape the attention of the schoolmen, nor of their master, Aristotle, the most comprehensive, though not the most penetrating, of the ancient philosophers. The categories, or predicaments, the former a Greek word, the latter its literal translation in the Latin language, were intended by him & his followers as an enumeration of all things capable of being named; an enumeration by the *Summa genera, i.e.* the most extensive classes into which Things could be distributed, there being no other mode of enumerating individuals of indefinite number. The following are the classes into which, according to these philosophers, all things nameable might be reduced:

Ουσια.	Substantia.
Ποσον,	Quantitas.
Ποιον,	Qualitas.
Προς τι,	Relatio.
Ποιεῖν,	Actio.
Πασχειν,	Passio.
Ποῦ,	Ubi.
Ποτε,	Quando.
Κεῖσθαι,	Situs.
Εχειν,	Habitus.

[¶3] The imperfections of this classification are too obvious to require, and its merits are not sufficient to reward, a minute examination. It is a mere catalogue of the distinctions rudely marked out by common language, with little or no attempt to penetrate, by philosophic analysis, to the *rationale* even of those distinctions. Such an analysis, even though imperfect, would have shewn that the

[**See also the opening paragraphs of the chapter on Predication,* p. 1005 *below.*]

enumeration is both redundant & defective, some objects being omitted, & others repeated over and over under different heads. It is not unlike a division of animals into men, beasts, horses, asses, and ponies. That, for instance, could not be a very comprehensive view of the nature of Relation, which could exclude Action, Passion, & Local Situation, from that category. The same observation will apply to the categories Ubi and Quando; though not so obviously. On the other hand, Sensations, & Feelings in general, are excluded from the enumeration. The impropriety of erecting into a *Summum genus* the class which forms the tenth category, is manifest.

In so far as the ten categories of Aristotle contain any distinctions which appear worthy to be preserved in the present more advanced state of analytical psychology, they will be included, by implication at least, in the attempt which we are about to make towards a better enumeration of *summa genera*, or classed Catalogue of Nameable Things.

[§2]

[¶1] It is indispensable, before we commence, to take notice of a very unfortunate ambiguity in all concrete names which correspond to the most general of all the abstract names, the word Existence. When we have occasion for a name which shall be capable of denoting whatever exists,—or in other words, (for the expressions are convertible) whatever is capable of being made a separate object of thought, and of receiving a separate name—there is hardly a word applicable to this purpose, which is not also, and even more familiarly, taken in a sense in which it denotes only *substances*. But substances are not all that exists; sensations also exist; and according to all systems of philosophy, however opposite, *attributes* may be asserted to have a real *existence*, with as much propriety as substances. Yet when we speak of an *object*, of a *thing*, we are almost always supposed to mean a *substance*. There would seem to be a kind of absurdity in using such an expression as this, that a *thing* may be merely an attribute of another *thing*: and at first sight of the heading of this chapter, "Classification of Things," there are, I believe, few persons who would not be led to expect a classification like that of naturalists, starting with the three great divisions of Animal, Vegetable, and Mineral, and subdividing these into classes and orders. If, rejecting the word Thing, we endeavour to find another of a more general signification, or at least more exclusively appropriated to that general signification; a word, denoting all that exists, and connoting nothing but simple Existence, no word might be presumed fitter for our purpose than *Being*; originally the present participle of a verb which in one of its meanings is exactly equivalent to the word *exist*; and therefore suited, even by its grammatical construction, to be the concrete of the abstract Existence. But this word, strange as it may appear, is even more completely spoiled for the purpose which it seems expressly made for, than the word Thing. *Being* is, by custom, exactly synonymous with Substance; except that it is free from a slight taint of ambiguity, being applied impartially to Matter & to Mind; while Substance, though originally in strictness applicable equally to both, is apt to suggest preferably the idea of matter. A Sensation is never called a Being; nor is an attribute ever called a Being. A Being is that which causes Sensations, that which *possesses* attributes. The soul may be called a Being; God, and Angels may be called Beings; but if we were to say, Extension, Colour, Wisdom, Virtue are Beings, we should perhaps

be suspected of thinking with some of the ancients, that the cardinal virtues are animals; or at least, of holding, with the Platonic School, the doctrine of self-existent ideas, or with the followers of Epicurus, that of Sensible Forms, which detach themselves in all directions from bodies, and, coming casually in contact with the human organs, are the causes of our sensations. We should be supposed, in short, to believe, that Attributes are Substances.

[¶2] In consequence of this perversion of the word Being, philosophers, looking about for something to supply its place, laid their hands upon the word Entity, a piece of barbarous Latin, invented by the Schoolmen to be used as an abstract name, in which class, by its form, it would seem to place itself, but being seized by logicians in distress, to stop a leak in their terminology, has ever since been used as a concrete name. The Kindred word Essence, born at the same time [*]and of the same parents, scarcely underwent a more complete transformation, when, from being the abstract of the verb *to be*, it came to denote something sufficiently concrete to be contained in a glass bottle. The word Entity, since it settled down into a concrete name, has retained its universality of signification somewhat less unimpaired than any of the names before mentioned. Yet the same gradual decay, which seems to affect all the language of psychology after a certain age, has been at work even here. If you call virtue an *entity*, you are indeed somewhat less strongly suspected of believing it to be a substance, than if you called it a *being*; but even then you are not quite sure that no more meaning will be taken than you intended to give. Every word which originally was intended to connote mere existence, seems after a time to enlarge its connotation to *separate* existence, or existence freed from the condition of belonging to a substance; which condition being precisely what constitutes an attribute, attributes in this manner are gradually shut out. Strange that when the greatest embarrassment of all who have many thoughts to express, is to find a sufficient number of words wherewith to express them, there should be no practice which philosophers are more addicted to, than that of taking valuable words to express ideas which are sufficiently expressed by other words already appropriated to them.

[¶3] When it is impossible to get good tools, the next best thing is to know accurately the defects of those we have. I have therefore warned the reader of the ambiguity of the very names which, for want of better, I am necessitated to employ. It must now be the writer's endeavour so to employ them, as in no case to leave his meaning doubtful or obscure. No one of the above words being altogether unambiguous, I shall not confine myself to any one, but shall employ on each occasion that word, the associations connected with which will least conflict with those which must be excited in order that what I have to say may be understood. The word Thing, being the least spoilt of any which are equally familiar, is that which I shall most frequently make use of. [¶4] The difficulty under which, in spite of all I can do, I must expect that both myself and my reader will labour in the attempt to use vague words with a precise meaning, is not wholly a matter of regret to me. Philosophical language will for a long time, and popular language, perhaps, forever, retain so much vagueness and ambiguity, that Logic would be of little use, if it did not, among its other advantages, exercise the understanding in performing its work neatly and correctly with imperfect tools.

[**Gathering* D *begins here.*]

[§6]

[¶*1*] All Things, then, are either Feelings, substances or attributes: or, to state the same proposition in other words, every name except the names of feelings, is either the name of a Substance or the name of an Attribute. These words, Substance and Attribute, are of so much importance in the Philosophy of Logic, that it is highly desirable to fix their meaning with precision. But it is scarcely possible to define strictly the distinction between them, without trespassing into the higher metaphysics. Nor is this absolutely indispensable for most of the purposes of this work; it would perhaps be sufficient to take the distinction for granted, & to suppose that the reader can tell a substance from an attribute, whether he be capable of metaphysically analysing the two notions or not. Nevertheless not to omit an enquiry so intimately connected with my subject, I shall attempt as much of the analysis of each as seems necessary for an accurate conception of the difference between them.

[¶2] Logicians have endeavoured to define Substance and Attribute: but their definitions are not so much attempts to point out the distinction between the two ideas, as instructions what difference it is customary to make in the grammatical construction, according as you are speaking of substances or of attributes. Such definitions are rather lessons of English, or of Latin or Greek, than of mental philosophy. An attribute, say the Schoolmen, must be the attribute *of* something: whiteness, for example, must be the whiteness *of* something; goodness must be the goodness *of* something. And if this something should cease to exist, or should cease to be connected with the attribute, the existence of the attribute would be at an end. A substance, on the contrary, is self-existent; when we are speaking about it, we need not put *of* after its name: a stone is not the stone *of* anything; the moon is not the moon *of* anything, but simply the moon. Unless, indeed, the name which we choose to give to the substance be a relative name: if so, it must be followed either by *of*, or by some other particle, implying, like that preposition, a reference to something else: but then the other characteristic peculiarity of an attribute would fail: the *something* might be destroyed, and our substance might still subsist. Thus, a father must be the father of a child, and so far resembles an attribute, in being referred to something besides himself: if there be no child, there can be no father: but this, when we look into the matter, only means that we should not call him father, as he would no longer come within the meaning of that term. The man called father might still exist, though not only the child, but all the universe, himself excepted, were destroyed; that is, the supposition would involve no contradiction. But destroy all white substances, and where would be the attribute whiteness? To suppose that it still continued to exist, would be a contradiction in terms.

[¶3] This is as near an approach towards a solution of the difficulty as will be found in the treatises on Logic; metaphysicians, however, have probed the question deeper. And in truth the above explanation was anything but satisfactory. If an attribute is distinguished from a substance by being the attribute *of* something, it seems highly necessary to explain what is meant by *of*: that pregnant particle, which, on this shewing, carries the whole of Intellectual Philosophy in its womb. And as for the self-existence of Substances, it is very true that a Substance may be conceived to exist without any other substance, but so also may an attribute without any other attribute; and we can as little imagine a substance without attributes as we can an attribute without a substance.

[¶4] Since, however, every attribute is an attribute of a substance, let us consider, in the first place, Substances. These are commonly divided into Bodies & Minds.

[§7]

[¶¶*1*,*2*] It would be remote from our purpose to embark in the controversy on which so much ink has been expended, that of the Existence of Matter as a Being in itself, distinguishable from the sensations or states of consciousness which it generates in sentient beings. This question belongs to the higher metaphysics; and I may add, that I am aware of no inquiry more utterly fruitless and barren, saving always the advantage of learning to think justly on any subject on which we are compelled to think. For the tyro, at least, in logic, nothing is more to be desired than that he should never even hear that such a question had been raised. In an Enquiry into the Philosophy of Logic, it is, however, indispensable to *state* the question, though but for the purpose of putting it aside.

[¶3] It is certain, then, that part of our notion of a body consists of the notion of a number of sensations of our own, or of other sentient beings, habitually occurring simultaneously. Our conception of a block of granite, for instance, is compounded of its visible form and size, which are complex sensations of *sight*; its tangible form and size, which are complex sensations of our organ of *touch* and of our *muscles*, its weight which is a sensation of touch and of the muscles, its colour which is a sensation of *sight*, its hardness which is a sensation of the muscles, its chemical properties which are said to be perceived by our various senses, and which are in reality nothing but sensations received through those senses. All these various sensations frequently *are*, and, as we learn by experience, always *might be*, experienced simultaneously: whence the thought of any one of them comes to excite the ideas of the others, and the whole become mentally amalgamated into one mixed state of consciousness, which, in the Language of Locke & Hartley, is called a *complex idea*, and which, though a compound of so many heterogeneous elements, has the appearance of being instantaneous and indivisible. With these feelings called *sensations*, other states of feeling frequently intermix themselves, of the kinds called *thoughts*, and *emotions*; for many objects, besides the impression they produce on our senses, excite in our minds other states of consciousness to which we give these other names.

[¶4] Now, there are philosophers who have argued thus: If we take an orange, and conceive it to be divested of its natural colour, without acquiring any new one; to lose its softness without becoming hard, its roundness without becoming square or polygonal or of any other figure whatever; to be deprived of its size, of its weight, of its taste, of its smell, to lose all its mechanical and all its chemical properties and acquire no new ones; to become, in short, invisible, intangible, inaudible, & without taste or odour; nothing would remain. Of what nature, in fact, could be the residuum? and by what tokens could it manifest its existence? And if there do really exist such a residuum, let us imagine it to be this instant annihilated by the fiat of omnipotence, by what signs should we be able to discover that it had ceased to exist? Should we not have as much reason to believe [in] its existence, after its annihilation had been accomplished, as we have now? But if its removal would make no change in our consciousness, we are not now conscious of its existence. Hence these metaphysicians were led to conclude, that

what we call a Body is nothing distinguishable from the sensations which it is said to produce in us. They characterised an object as merely a bundle, group, or cluster of sensations. The philosophers who took this view of the nature of bodies, were said to deny the existence of Matter.

[¶5] Other philosophers, on the contrary (and this is the prevalent opinion) contend that an object is not a group of sensations only, but the sensations & something else; or rather, that the object is not the sensations, but something which we regard as the immediate cause of the sensations. The schoolmen used to call it a *substratum*, and supposed that its attributes *inhered* in it, as they expressed themselves; literally stuck in it. This language is now exploded; but the idea which it was intended to express still remains. To this substratum, the name Matter is usually given in philosophical discussions. It was soon, however, acknowledged by all who reflected on the subject, that it was impossible to prove, by extrinsic evidence, the existence of Matter. Being asked, therefore, how they knew it, they answered, by direct intuition. And here, according to the definition formerly given, the inquiry enters into the field of Transcendental Metaphysics; where we intend to leave it.

[¶6] While, however, philosophers have been thus divided on the question whether objects are anything besides our sensations, the only point which is of much real importance, is one on which there has at length been brought about a very general agreement: viz: that *all we know* of objects is merely the sensations which they give us. Kant himself, on this point, is as explicit as Berkeley or Locke. There are few Ontologists among modern metaphysicians. However strongly they may be convinced that there exists a universe of "things in themselves," totally distinct from the universe of Phenomena, or things as they appear to our senses; and even though they may invent, like Kant, a technical expression as *Noumenon*, to denote what the thing is in itself, as contrasted with the representation of it in our minds; they nevertheless allow that this representation, which is a mere compound of our own sensations, is all we *know* of the object, and that the real nature of the thing itself, is, and by the constitution of our faculties must ever remain, an impenetrable mystery to us. [¶7] There is not the slightest reason for believing that what we call the sensible qualities of an object bear any affinity to the nature of the object itself. The object is merely the cause of them: and a cause does not always resemble its effects; a north wind is not at all like the feeling of cold, nor a coal fire like the steam of boiling water: why then should matter, the cause of our sensations, resemble the sensations themselves? [¶6,n] An attempt has indeed been made by Dr. Reid to establish that although some of the properties which we ascribe to objects exist only in our sensations, others really exist in the things themselves, being such as cannot possibly be copies of any impression on the senses; and he asked, with a triumphant air, from what sensation our notions of *extension* and *figure* can have been arrived [*sic*]? These, according to him, must be qualities of *things in themselves*, known to us like the existence of those things, intuitively. The gauntlet thrown down by Dr. Reid was taken up by Dr. Brown: who, applying greater powers of analysis than any of his predecessors had done to the notions of extension & figure, shewed clearly what were the sensations from which those notions were derived, and of the ideas of which, they were compounded: viz: sensations of touch, combined with sensations of a class previously too little adverted to by metaphysicians, those which have their seat in our muscular frame. Whoever wishes to be more particularly acquainted with this admirable specimen of meta-

physical analysis, may consult the first volume of Brown's Lectures, or Mill's Analysis of the Phenomena of the Human Mind. To introduce the discussion here, would swell an inquiry essentially subordinate and parenthetical, into such a bulk as to detain the mind longer than is desirable on its passage from what precedes to what follows.

[§9]

[¶¶*1*,*2*] Since, then, we know nothing of bodies, except the sensations and other states of feeling or consciousness which we are said to derive from them; and these being either permanent or changeable; it evidently follows, that the sensations or states of consciousness excited by an object, and the changes in those sensations or states of consciousness, constitute its *attributes*.

Sensations, or rather states of feeling, excited by objects taken one by one, form that kind of attributes commonly called the *qualities* of objects. Sensations or other states of feeling excited by two or more objects jointly, and which could not be produced by the same objects taken separately, form that kind of attribute called a *relation*: a relation among these objects; a relation between each one of them and all the rest.

Those propositions require some elucidation.

[¶3] Let us take, for the purpose of illustration, any one of what are termed the sensible qualities of objects. Say, for example, whiteness. When we ascribe whiteness to any substance, as for instance, to snow; when we say that snow has the quality of whiteness, what is it we really assert? Simply, that when snow is present to my organs, I have a particular sensation, which I am accustomed to term the sensation of white. But how do I know that Snow is present? Obviously by the sensations which I derive from it, and not otherwise. According to one theory my consciousness of these sensations is all I really mean by the presence of the object; according to another theory it only *proves* the presence of the object. We shall not inquire into this. The object, however, is neither more nor less than a cluster of sensations, or an unknown something which gives me a cluster of sensations. And when I ascribe to the object the attribute whiteness, my meaning is only that of this group, or series of sensations, whether simultaneous of successive, that which I call the sensation of white forms a part.

[¶4] An objection may here be made. It may be admitted that we know nothing of sensible objects, except the sensations which they excite in us: that the fact of our receiving from Snow that particular sensation, which we call the sensation of white, is the only *ground* we have for ascribing to that substance the quality whiteness; the only *proof* that Snow possesses that quality. But because one thing may be the sole evidence of the existence of another thing, it does not follow that the two things are one and the same. The attribute whiteness, it may be said, is not the sensation, nor the fact of our receiving the sensation, but something in the object itself; a *power* inherent in it; something which produces the sensation; which is the real cause of its being excited when the object is presented to our organs. And when we affirm that Snow possesses the attribute of whiteness, we assert not merely that the presence of snow produces in us that sensation; but that it does so by virtue of this mystical entity, called a quality.

[¶5] For this doctrine of the existence of a distinct and peculiar species of entities termed qualities, I can see no foundation except in a tendency of the human mind, which is the cause of many delusions. I mean the disposition,

wherever we meet with any two names which are not precisely synonymous, to suppose that they must be the names of two different things,—whereas in reality, both are often names of the same thing, viewed (to use a popular expression) in different lights. Thus, in the present case, because quality and sensation cannot be put indiscriminately one for the other, it is supposed that they cannot both of them signify the same thing, viz: the impression or feeling with which we are affected when we see any white object: although there is at least no absurdity in supposing that this identical impression or feeling may be called a sensation when considered merely in itself, & a quality when regarded as accompanying or as emanating from any one of the numerous *objects*, the presence of which to our organs, excites in our minds that among various other sensations or feelings.

If this be not a sufficient account of the meaning of the word quality, it rests with the believers in an entity *per se* bearing that name, to produce some proof of its existence. Until they do so, their opinion can only be held to be a lingering remnant of the Scholastic doctrine of occult causes; the very absurdity, in fact, which is so happily ridiculed by Moliere, when he makes one of his pedantic physicians account for the fact that "l'opium endormit" by the maxim "parcequ'il a une vertu soporifique."

[¶6] It is evident that when the physician stated that opium had "une vertu soporifique," he did not account for, but merely asserted over again, the fact that it "endormit." In like manner, when we assert that snow has the quality of whiteness, we are only affirming over again in more technical language, that it excites in us the sensation of white. The other expression conveys no explanation, because it informs us of no new fact, or, if of any, of one which is not conceivable by our faculties, and cannot be proved to be true. If it be said that the sensation must have some cause, I answer, undoubtedly; the presence of the object is that cause. When I have asserted, that whenever the object is present and my organs in their natural state, the sensation takes place, I have stated all that I know or can know about the matter. I have stated the effect, and assigned its cause. I have no occasion, in addition to this certain and intelligible cause, to suppose an occult cause besides. If I am asked, why does the presence of the object cause this sensation in me, I cannot tell; I can but say, because such is the law of my nature, & of the nature of the object: the Author of the universe, or the constitution of things, will have it so. And this, after all, is what we must come to at last, even when we have interpolated the imaginary entity. Whatever number of links the chain of causes and effects may consist of, how any one link produces that which is next to it remains still equally inexplicable to us. It is as easy to comprehend that the object should produce the sensation directly and at once, as that it should produce the same sensation by the aid of a third entity called the *power* of producing it.

[¶7] If, however, any reader considers these arguments insufficient, and still holds to the belief that a sensible quality is something different both from the sensation in our minds, and from the object which produces that sensation, I shall not argue further with him in this place, but refer him to the higher metaphysics, to which Science this, as part of the great question of Causation or Power, properly appertains. It rests with that Science to determine whether we have an intuitive perception of Qualities or Attributes in the sense which persons of these views attach to the words. For, all persons having any pretension to the character of philosophers, who believe that such entities exist, have been reduced to the necessity of admitting that we cannot prove their existence, so that they are

either known to us intuitively or not at all. Should the conclusion be that they really exist, it will not vitiate the subsequent part of this work, the deductions of which do not in any material degree depend upon the view which I have taken of the nature of Attributes. For my purpose it is sufficient that some names are names of objects, and some of attributes, and some are names of objects, connoting attributes. All this is true, in whatever way we may analyse Attributes, or though we should not analyse them at all.

[§10]

[¶*1*] We have thus far attended only to those attributes which are commonly called qualities: being those which respect only the object itself, and us, the sentient mind; & which would remain, if we were to suppose all other objects annihilated. These attributes we have found to consist of the various sensations, or groups or trains of sensations, which the object causes us; or of the other feelings of all sorts, the purely mental, as they are called, which the contemplation of it excites in our minds.

But there is another class of attributes, the conception of which necessarily includes the ideas of other substances besides the object itself to which the attribute is ascribed. These attributes of an object are called its *relations* to other objects. The observations in the preceeding chapter on relative names, united with what has just been said on the nature of the first class of attributes, render it easy for the reader to anticipate the view which will be taken of the nature of the attributes to be now adverted to.

[¶2] It is certain that there may, with propriety, be said to be a relation between any two things, to which two correlative names are or may be given. This is only inverting the tritest and least disputable (though least significant) definition of a relative name: viz: that it is a name which signifies a relation. By enumerating, therefore, the principal cases in which mankind have imposed correlative names, & observing what all those cases have in common, we may expect to discover, if it be discoverable, what is that which constitutes a relation.

[¶3] What then is the character, which is possessed in common by states of circumstances so heterogeneous & discordant as these:—one thing *like* another, one thing *unlike* another; one thing *near* another, one thing *far from* another; one thing *before* another, one thing *after* another, one thing *along with* another; one thing *greater, equal, less* than another; one thing the *cause* of another, one thing the *effect* of another; one person the *father, child, master, servant, husband, wife, sovereign, subject, attorney, client*, of another; & so on?

[¶4] There seems to be nothing whatever that is common to all these cases, except only this; that in each of them there exists or occurs, or has existed or occurred, some fact or phenomenon, into which both the things which are said to be related to each other, enter as parties concerned. This fact or phenomenon, the Aristotelian philosophers called the *fundamentum relationis*. Thus, in the relation of greater and less between two lines or surfaces, the *fundamentum relationis* is the fact that when one of the two magnitudes is applied to the other, it does not entirely cover it. In the relation of husband and wife, the *fundamentum relationis* is, that the parties are a man and a woman, that they have promised certain things with certain formalities, and are in consequence invested by the law with certain rights and subjected to certain duties. It would be easy to multiply examples. It is obvious that when we examine the signification of a

relative name, and find out correctly and completely what it connotes, that forms the *fundamentum* of the relation which that relative name is said to express.

[¶5] Now, examination will shew that this kind of attributes, like that which we previously enquired into, consists of nothing whatever but states of human consciousness. In the highly complicated case last cited, for example, the relation of husband & wife, the fact or phenomenon which is the *fundamentum relationis*, and which is of an extremely complex nature, is wholly composed of the following elements, viz: 1. Sensations, thoughts, emotions, and volitions of the parties themselves. 2. Sensations, thoughts, emotions, and volitions of other people, excited by acts of the parties themselves, or which would be excited were they to act in a particular way: the intentions, for instance, which would be formed by a Judge, in case a complaint of the violation of the conjugal engagement were brought before his tribunal; and the acts which the Judge would perform in consequence. If it be asked what an act is, it is nothing whatever but one of the states of consciousness called volitions, causing in the mind either of the individual himself, or of some other individual, one of the states of consciousness called sensations. The whole, therefore, resolves itself into states of consciousness; human feelings, either bodily (as they are called) or mental: feelings, however, which are not excited by one of the two related objects, but by both of them taken together. In the case of the complicated matter of fact, connoted by the words husband & wife, all the simpler matters of fact which make it up are states of things which concern one of the two persons in precisely the same degree as the other; and no other object except those two, is concerned in *all* of them.

[¶6*] All cases of relation are not so complicated as that to which we last alluded. In the case of *nearness* for instance, or *remoteness* in *place*, the *fundamentum relationis* is the two objects themselves, with the space intervening between them. In the case of *likeness*, it is 1. the two objects in juxtaposition, or the ideas of the two objects succeeding one another in our minds, and 2. that state of consciousness called the feeling of resemblance (in whatever way we may analyse this feeling) immediately succeeding the contemplation of them. In the case of *antecedent & consequent*, as between two events, the *fundamentum* of the relation is the events themselves, succeeding one another in order of time. But an event is merely a change; one thing ending or another beginning; an object ceasing to exist, or ceasing to cause certain sensations; or another object beginning to exist, or beginning to cause certain sensations. Whatever relation we examine, we still find nothing except the related objects, and the sensations or other states of consciousness which they excite. And we may consequently consider it as proved, that the attributes commonly called relations as well as those commonly called qualities, are but names for states of the consciousness of sentient beings, considered as excited by objects.

[§14]

[¶1†] We have hitherto spoken only of the attributes of bodies. Minds also have attributes: but the analysis of these, after what has preceded, presents little difficulty. The attributes of minds, like those of bodies, are merely states of feeling or consciousness. But in the case of a mind we have to consider its own states of feeling or consciousness, as well as those which it excites in other minds. Every

[**Some material in this paragraph also contributed to* §§11 *and* 13.]
[†*Some material in this and the next paragraph also contributed to* §8, ¶1.]

attribute of a mind consists either in being affected in a certain way, or affecting other minds in a certain way. In the former case, nothing is implied, external to the mind itself, not even the existence of another percipient mind.

The only attributes which can with truth be ascribed to a mind, without reference to any other substance, either mental or corporeal, are its own various states; that is to say, the actually being in one of those states, or the liability to be in one of them. Now, all in the mind which even the mind itself is aware of, is a certain thread of consciousness; a certain series of feelings, that is, thoughts, volitions, sensations, & emotions, more or less numerous and complicated. Respecting mind as respecting body, there are two systems of philosophy. The one holds that the mind itself is this thread of consciousness, & nothing more; the other, that there is the thread of consciousness, and likewise a something which is conscious, a *thinking principle*, as it has been called, a peculiar kind of being, called a mind. To decide between these two theories belongs not to Logic, but to the more abstruse Science so often alluded to. But whichever of these two theories may be true; whether what I call *myself*, be only the series of feelings which I experience, and which constitute my sentient existence, or whether there be these feelings and something besides these feelings called *myself*; it must in either case be admitted that of any *self*, other than the series of my feelings, I do not & cannot know anything except its bare existence. As bodies only manifest themselves to me through the sensations which I feel when they are present, so the thinking principle, or mind, in myself, makes itself known to me only by the feelings of which it is conscious. We can predicate no quality of it, considered in itself, but the series of its own feelings. When we say of any mind that it is devout, or superstitious, or meditative, or cheerful, we mean that the ideas, emotions, and volitions implied in those words, form a frequently recurring part of the series of feelings or states of consciousness, which fill up the existence of that mind.

[¶2] Besides those attributes of a mind which consist of its own states of feeling, we may also ascribe attributes to a mind as well as to a body, considered as an object of contemplation to other minds. The most important instance of this is, the employment of terms expressing approbation or blame. When, for example, we say of any mind, that it is admirable, we mean, that the idea of it excites the sentiment of admiration in us, together with the feeling of moral approbation, for the word implies that we not only feel admiration, but approve that feeling in ourselves. Just as when we say of snow that it is white, we mean that the perception of it excites in us the sensation of white.

In some cases, under the semblance of one single attribute, two are really attributed, one of them a state of the mind itself, the other a state with which other minds are affected by the contemplation of it. As when we say of any man that he is generous. The word generosity expresses a certain state of mind; but it also expresses that this state of mind excites in us another mental state called approbation. The assertion, therefore, really made is double; and of the following purport: Certain feelings form a frequent part of this person's thread of consciousness, and moreover the idea of those feelings of his, excites in us the sentiment of approbation.

[*]Minds as well as bodies may be *related* in a variety of ways, to other minds, & to bodies. A mind may be *like*, or *unlike*, another mind; it may be *prior* or *posterior* in order of time, to another mind, or to a body: a mind may *perceive*,

[**This paragraph disappeared in the rewriting of* §8.]

& a body may *be perceived*; a body may *act* upon a mind, that is, may *cause* it to be conscious of certain feelings: a body may be *acted upon* by the mind which animates it, that is, the mind may *cause* the body to *act* in a particular way on its own or other minds. These relations between minds, and between body & mind, require no other explanation from us, than that already given of the relations between bodies.

[§3, ¶3*] So much for the attributes of bodies and of minds. It is now necessary to recal the reader's attention to a remark already made; that the division of all things into substances & attributes, and of substances into bodies & minds, and consequently of all things whatever into bodies, minds, and attributes, is not exhaustive[†]. A sound, for example, cannot be said to be either a body or a mind; yet it is not an attribute. Sonorousness is the name of an attribute, but *sound* is a concrete name. It is a name for a certain sensation considered in itself, not implying that it emanates from any object. We know in point of fact that sounds always are produced by objects; but we can conceive that the case might be otherwise. We may conceive everything annihilated in the universe, except sounds, and ourselves hearing them. If we shut our eyes and listen to music, we may form to ourselves a conception of such a universe.

In like manner, *hope*, *joy*, *fear*, are names of other states of consciousness, considered independently of the mind which is conscious of them. If we considered them as states of any particular mind, or even thought of them as modifications of a substance called a *mind* at all, the words we should use would be *hopingness*, or *hopefulness*, or a *state of hope*, but not *hope* simply. *Hope* is a concrete name. *Hopingness* and *hopefulness* are abstract ones.

In this class of nameable objects, we must rank names themselves, and other portions of discourse; these being either sounds, or written characters. Thus, *noun*, *verb*, &c. are names of names.

We have thus three classes of names. Names of substances; i.e. of the bodies which excite and the minds which experience feelings; Names of attributes, i.e. of feelings, considered as excited or experienced by substances; and names of the feelings considered in themselves.

Substances may have attributes; feelings or states of consciousness may have attributes; and attributes themselves may have attributes.

Of the attributes of substances enough has been said. The attributes of feelings and the attributes of attributes themselves, present scarcely any additional difficulties.

The qualities of which a feeling, or a combination of feelings or a series of feelings, is susceptible, seem to consist only in being composed of certain parts, and in exciting certain ideas and emotions in our own mind when it thinks of them. All the other attributes of a feeling are relations. Such is, for instance, the attribute of belonging to a certain mind: for this supposes something other than the feeling itself and its parts and our mind contemplating the feeling: it supposes a mind to which the feeling belongs.

It is not necessary to enumerate all the possible relations of a feeling, or series

[**From this point to the end of the chapter, while some parallels and similarities to the final version are indicated, the rewriting was so extensive as to make exact collation impossible.*]

[†*At this point JSM cancelled the concluding clause:* , unless the words body & mind are taken in a larger sense than is usually, or perhaps can be conveniently, attached to them]

of feelings. A feeling may be *like*, or *unlike*, another feeling, and so related to the feeling: it may be *like* or *unlike* a feeling of another mind; and so related to that mind. A feeling may be *excited* or *caused* by a body, or by a mind, or by a feeling; and in its turn it may *cause* another feeling. All these relations of feelings, correspond to relations of precisely the same nature between bodies; and whatever explanation suffices for the latter, will serve equally for the former.

Remains only the attributes of attributes. But neither in the analysis of these is there any peculiar difficulty.

An attribute is never said to be composed of parts. The sensation or other state of consciousness which constitutes the attribute, may be composed of parts; but however complex the matter of fact may be, the attribute itself is considered to be one and indivisible.

An attribute, however, as well as a subject, may be an object of thought or contemplation to a percipient mind; and being contemplated, may excite in that mind any thought or emotion. To excite any state of consciousness is itself an attribute; one of those which we have named qualities. An attribute, therefore, may have qualities, when considered as an object of contemplation to a mind.

An attribute may also have relations. We may say that one attribute resembles another; that one attribute is the cause, or effect, of another. The meaning of this is obvious. What constitutes an attribute being always some *phenomenon*, that is, some state of consciousness,—some feeling, or combination or series of feelings; when we say that one attribute resembles another, the resemblance which really exists is between the feelings, or combinations of feelings, which constitute those attributes respectively: and when we say that an attribute is the cause, or the effect of anything, the real cause or effect is either the feeling constituting the attribute, or the object to which the attribute belongs.

[*]A relation may exist even between relations. One relation may resemble another; one relation may coexist with another; one relation may succeed to another; one relation may cause another. In all these cases, what really resemble, or coexist with, or succeed, or cause each other are the facts or phenomena, the complicated states of consciousness, which, when considered as proceeding from the conjunction of two or more objects, are called relations. [§11, ¶3] The case of resemblance between relations is one of the commonest of all the cases in which an attribute is ascribed to attributes. Thus, the relation in which Priam stood to Hector, namely that of father and son, resembles the relation in which Philip stood to Alexander: resembles it so closely that they are called the *same* relation. This means that in the complicated set of phenomena which constitutes the *fundamentum* of the relation between Priam and Hector, and that other set of phenomena equally complicated which constitutes the *fundamentum* of the relation between Philip & Alexander; as much of each of these two histories (for they are nothing less) as is signified by the words *father* and *son*, is exactly the same, or (to speak with stricter propriety), undistinguishably alike, in the two cases.

When two attributes are united, or coexist, there is a resemblance of relations. The two attributes stand in the same relation to the same substance; they both of them are attributes of it: the same substance excites both sets of sensations or feelings.

[**Gathering* E *begins here. The last folio of Gathering* D *being about two lines short, there may have been some rewriting here.*]

[§11, ¶4] There are other cases in which relations resemble, yet not so closely as to be called the *same* relation. Thus, we may say, that a thought suggested to the mind of a person of genius is like a seed cast into the ground, because the former produces a multitude of other thoughts, and the latter a multitude of other seeds. This is saying that between the relation of an inventive mind to a thought contained in it, and the relation of a fertile soil to a seed contained in it, there exists a resemblance: but no one would think of saying that there existed an identity. It is indeed evident that when two pairs of objects are concerned respectively, in two sets of phenomena, the slightest resemblance between these sets of phenomena will admit of its being said that the relation between the first pair and the relation between the second resemble one another.

[§11, ¶5] Whether we say that two *objects* resemble, or two *qualities* of objects, or two *relations* of objects, we always mean the same thing: that the sensations which we receive from the two *objects*,—or such part only of those sensations as constitute the two *qualities*,—or such complicated sets of sensations, (including those excited by the two objects) as constitute the two *relations*,—that these two sets of sensations in short, whether they are *experienced* together or only *thought of* together, are followed in our minds by a certain feeling, which, for want of any more appropriate name to express it by, we call the perception of resemblance. This feeling, the task of analysing which does not belong to Logic, may exist, like almost all other feelings, in different degrees. When it exists in the highest degree of all, i.e. when the two things, if perceived separately, could not be distinguished from one another, the resemblance is often called identity, and the two things are said to be the same: as when we say that the sight of any object, gives me the *same* sensation or emotion to-day that it did yesterday. This is an evident though often an inevitable, misapplication of the words "the same:" for the feeling which I had yesterday is gone, and never can return; that which I have to-day is another feeling, different from the preceeding, though so exactly like it, that no trace of any dissimilarity can be perceived. I think it will be found that great confusion of ideas is often produced, and many fallacies engendered in otherwise enlightened understandings, by the habit of always confounding under one name ideas so different as those of perfect likeness & identity. The Schoolmen had appropriate names to express this as well as many other distinctions, which philosophers have lost the habit of attending to since they began to look with disdain upon the Aristotelian Logic. Two things which were so perfectly alike as to be undistinguishable, were said to differ *numero tantum*; i.e. to differ only in being two instead of one, in being different numbers in a catalogue. But things which are in any the slightest degree unlike, may be said to differ not only *numero* but *specie*. This expression, as well as the former, is borrowed from the Schoolmen, but with a slight extension of its meaning.

[§15]

[¶¶*1*, *10*] The analytical view which has been taken in the preceeding pages of the nature of Attributes, has brought under our notice all those leading distinctions which seem most suitable to be taken in the basis of a Classification of Entities, or enumeration of *Summa genera*, such as was attempted in the categories of Aristotle.

Attributes have been found to differ from one another in the following parti-

culars, which may be taken as principles of so many mutually intersecting divisions:

1. Attributes are either Attributes of Substances, attributes of feelings or attributes of other attributes.

Substances are either Bodies or Minds; and accordingly Attributes of Substances are either Attributes of Bodies or Attributes of Minds.

[*]2. The fact or phenomenon constituting an Attribute, may either be a fact which concerns only the subject itself, with or without a percipient mind; or it may be a fact which concerns jointly that subject and other subjects. A fact of the first kind can only be considered as an attribute of that one subject; but in the second case, the same individual fact may constitute an attribute of every one of the subjects concerned in it. In the former case, the attribute is called a Quality; in the latter, a Relation.

To render the classification complete, a further consideration remains to be introduced. A thing may be considered either as it exists in any one given instant of time, or as it exists in successive instants. In other words, we may consider its mere state, or its changes of state: its attributes at any given moment, or the changes which it undergoes in its attributes, losing some and acquiring others. Hence attributes may be divided into *states* of the subject, and changes of state: into *properties* and changes of properties: into *properties* & *events*.

Such are the different kinds of attributes which may be possessed by one object. When we suppose two or more objects, we introduce an additional kind of attribute which cannot be possessed by one object only, viz: the attribute of number.

[¶5] The following, then, appears to be a complete enumeration of all nameable things:—

1. Substances.
2. Feelings.
3. Qualities.
4. Relations.
5. Events; or changes of feelings, qualities, and relations.
6. Numbers.

[†]But if the analysis which we have attempted of quality & relation be correct, the distinction between these and feelings is not a distinction between things, but only a difference in the light in which they are viewed for the purpose of naming them.

The above classification of nameable objects could not be dispensed with in attempting an exposition of the Philosophy of Logic. As the nature of the subject renders it somewhat more abstruse than any other portion of the work, I would willingly have placed it at a greater distance from the commencement, had there been any other place suitable to it; but I could find none so suitable as this. I have aimed at including in the chapter itself, everything that is necessary to render it intelligible; but if I should have failed in making my arguments understood, or if, being understood, they should fail to convince, the reader will not, I believe, find this any considerable hindrance to the intelligibleness of the succeeding chapters.

[**The matter of this paragraph contributed to* §10, ¶1.]
[†*The material in this paragraph is related to* §13, ¶1 *and* §15, ¶4.]

LINEA PRÆDICAMENTALIS.[*]

- SUBSTANCES
  - *Bodies*
  - *Minds*
- ATTRIBUTES
  - Attributes which may belong to one subject
    - Properties
      - *Qualities*
      - *Relations*
    - Events, or changes
      - Changes of Feeling.
      - Changes of Quality.
      - Changes of Relation.
  - Attributes which can only belong to more than one subject: *numbers.*
- FEELINGS
  - Feelings excited by bodies,—*Sensations*
  - Feelings excited either by bodies or minds
    - *Thoughts*
    - *Emotions*
    - *Volitions*

[**See Textual Introduction,* p. lxii.]

OF PREDICATION

[Chapter iv: Of Propositions]

[§*1*]

[¶¶*1*, *2**] All enquiries into the nature of Predication must have one of two objects: To analyse the state of the human mind, called Belief; or to analyse that which is believed. The former problem belongs to the higher metaphysics, the latter to Logic. All language recognises a difference between a doctrine or an opinion, and the act of a man's mind in entertaining the opinion; between assent, and that which we assent to. Logic, as I conceive the limits of that Science, has no concern with the nature of the act of *judging*, but only with the nature of the *judgment* which is the fruit of that mental operation. To use the language which the German metaphysicians have borrowed from the schoolmen, the Logician considers the phenomenon [of] Belief *objectively* only, and not *subjectively*.

[†]Into the analysis of Predication, so far as it belongs to our subject, we are now prepared to enter. For inasmuch as whatever we believe, if we express it at all, expresses itself in the form of a proposition; & *might*, in *all* cases, be so expressed, if we thought fit; an enquiry into the nature of the immediate object of belief, is an enquiry into the meaning of *propositions*. But every proposition consists of two *names* connected by a copula. An enquiry therefore into the meaning of names, such as that which we have now concluded, is the proper foundation for an inquiry into the meaning of propositions, or into the nature of what is termed a judgment, an opinion, a doctrine, or (when we ourselves assent to it) a truth.

[‡]By examining on the one hand *names*, on the other hand, *nameable things*, we have arrived at the following results. That names are either concrete or abstract. That concrete names are either proper or connotative. That proper names are merely unmeaning marks attached to single objects in order that we may be able to talk or write about them: but that all other words, whether connotative or abstract, express attributes: and that the meaning of all words whatever which have a meaning, consists in attributes. We have next analysed the notion of an attribute, & of each of the principal kinds of attributes. And we have found that they are all of them states of human consciousness; either excited by objects, or originating in the mind itself:—including in the idea of a state of consciousness, any series or succession of such states.

[§]If the above be a correct analysis of the meaning of names, & if propositions consist of names, it cannot now be a very long process to analyse the meaning of Propositions.

[Chap. iv, §1, ¶5] But before we attempt this analysis we must premise an explanation of the technical terms commonly in use to express the principal distinctions which exist among propositions.

[**Cf.* Chap. v, §1, ¶¶1, 2.]
[†*Cf.* Chap. iii, §1, ¶1, *and* §15, ¶9.]
[‡*In effect, this paragraph summarizes the material of* Chaps. ii *and* iii.]
[§*This paragraph disappeared in the rewriting.*]

[§2]

[¶1] A Proposition is a form of discourse in which something is affirmed or denied of something.

The first division, therefore, of Propositions, is into *Affimative & Negative*. An affirmative Proposition is that in which the predicate is affirmed of the subject; as, Cæsar is dead. A negative proposition is that in which the predicate is *denied* of the subject; as Cæsar is not dead.

[§3]

[¶1] The second division of Propositions is into simple and complex. A simple proposition is a proposition in which *one* predicate is affirmed of *one* subject. A complex proposition is a proposition in which there is more than one predicate, or more than one subject, or both.

[¶2] At first sight, this division has very much the air of an absurdity: a grand distinction of things into one and more than one: as if we were to divide horses into simple horses and complex horses, meaning by a complex horse, a horse which is several horses at once. And in truth, what is called a complex proposition is often not a proposition at all, but a plurality of propositions, held together by a copulative conjunction. Such, for example, as this: Cæsar is dead, & Brutus is alive: or even this; Cæsar is dead, *but* Brutus is alive. There are here two distinct propositions; and we might as well call a street a complex house, because all the houses in it are joined to one another, as call these two propositions a complex proposition because they are joined together by a particle. It is true that the Syncategorematic words *and* and *but* have a meaning; but that meaning is so far from making the two propositions one, that it adds a third proposition to the former two. All particles are abbreviations, generally abbreviations of propositions; a kind of short-hand, whereby that, which to express it fully would have required a proposition or a series of propositions, is suggested to the mind at once. Thus the words, Cæsar is dead *and* Brutus is alive, are equivalent to these:—Cæsar is dead; Brutus is alive; it is my wish that the two preceeding propositions should be thought of together. If the words were, Cæsar is dead, *but* Brutus is alive, the sense would be equivalent to the same three propositions, together with a fourth; viz: the following:—"Between the two preceeding propositions there exists a contrast:" i.e. either between the two facts themselves, or between their probable consequences.

[¶3] In the instances which we have given, the two propositions are kept visibly distinct: each subject having its separate predicate, and each predicate its separate subject. But it frequently happens, that for brevity, & to avoid repetition, the different propositions are jumbled together. Thus, John & William are good men, signifies John is a good man; and William is a good man. John is a good and a brave man, signifies, John is a good man, and John is a brave man. John & William are good and brave men, signifies, John is a good man, and John is a brave man, and William is a good man, and William is a brave man.

[¶4] We have seen that when the two or more simple propositions which compose what is called a complex proposition, are stated categorically, and not under any condition or proviso, the pretended complex proposition is not a proposition at all, but a plurality of propositions; since what it expresses is not a single assertion, but several assertions, which, if true when joined, are true also when separated.

But there is a kind of proposition, which, although it contains a plurality of subjects and of predicates, and may be said, in one sense of the word, to consist of several propositions, contains nevertheless only one assertion; and its truth does not at all imply that of the simple propositions which compose it. An example of this is, when the simple propositions are connected by the particle *or*; as, *Either* A is B, *or* C is D: or by the particle *if*; as, *If* A is B, *then* C is D. In the former case, the proposition is called *disjunctive*; in the latter, *conditional*: the name hypothetical is common to both. As Dr. Whately has well observed, the disjunctive form is resolvable into the conditional: every disjunctive proposition being equivalent to two or more conditional ones. Either A is B, or C is D means, If A is not B, C is D, & if C is not D, A is B. All hypothetical propositions, therefore, are conditional ones, and the two words are synonymous. Propositions which are not hypothetical, are said, in the language of logicians, to be *categorical*.

[¶5] A hypothetical proposition is not, like the pretended complex propositions which we previously considered, a mere aggregation of simple propositions. Though simple propositions form part of the words in which it is couched, they form no part of the assertion which it is intended to convey. When we say, If the Koran comes from God, Mahomet is the prophet of God, we do not mean to affirm either that the Koran really comes from God, or that Mahomet is really his prophet. Neither of these simple propositions may be true, and yet the truth of the complex proposition may be indisputable. What is asserted is not the truth of either of the two propositions, but the dependence of the one upon the other.

What, then, is the subject, and what the predicate, of the hypothetical proposition? for a subject and a predicate it must have, like every other proposition. "The Koran" is not the subject of it, nor is "Mahomet:" for nothing is affirmed, either of the Koran or of Mahomet. The real subject of the hypothetical predication is the entire proposition, "Mahomet is the prophet of God;" for it is of this that the affirmation is made: & the affirmation is that this proposition is a legitimate inference from the proposition "The Koran comes from God." The subject and predicate, therefore, of a hypothetical proposition, are two many-worded names, both of them names of propositions. One of them, the subject, is the name of an individual proposition. The other, the predicate, is a general name, of this form, "an inference from so and so:" denoting a proposition, and connoting that its truth is apparent to any person, who, being capable of reasoning, believes a certain other proposition.

I have already observed that all particles are abbreviations; this observation is now exemplified in the particle *if*. If A is B, C is D, is an abbreviation of the following, The proposition C is D, is correctly inferrible from the proposition A is B.

[¶6] There is, therefore, no fundamental difference between hypothetical propositions and categorical ones. In a conditional as truly as in a categorical proposition, one predicate is affirmed of one subject, & no more. We may call it a complex proposition, but its real characteristic is, that it is a proposition concerning a proposition: that the subject of the assertion is itself an assertion. This, however, is not peculiar to hypothetical propositions. There are many other propositions relating to propositions; or, in other words, having propositions for their subjects. A proposition, like anything else, may have attributes; and those attributes may be predicated of it. One attribute which may be affirmed of a proposition, is that of being an inference from another proposition. But this is

only one among many attributes of propositions: a conditional proposition, therefore, is only one of many kinds of propositions, having a proposition for their subject.

We may say, That the whole is greater than its part, is an axiom in mathematics: That the Holy Ghost proceeds from the Father alone, is a tenet of the Greek church: The doctrine of the divine right of Kings was renounced by the British Parliament at the Revolution: The infallibility of the Pope has no countenance from Scripture. Not one of these can possibly be mistaken for a conditional proposition. In all these, however, the subject is an entire proposition. That which these different predicates are affirmed of, is *the proposition* "The whole is greater than its part;" *the proposition* "The Holy Ghost proceeds from the Father alone;" *the proposition* "Kings have a divine right;" *the proposition* "The Pope is infallible."

[¶7] There is nothing about this class of propositions which seems particularly difficult of comprehension. There is no difficulty in understanding that as we may make an assertion respecting anything else, so we may make an assertion respecting an assertion. A hypothetical proposition is one particular kind of assertion respecting an assertion; and there does not seem to be so generic a difference between it and any other kind, as to account for its having been selected to fill so conspicuous a place in Treatises on Logic, while the others have remained blended in the general mass of Categorical Propositions. Hypothetical propositions, indeed, have so far a peculiar claim to the attention of the Logician, that what they assert of an assertion, is its being a logical inference from another assertion.

[§4]

[¶1] The third division of Propositions is into *universal*, *particular*, *indefinite* and *singular*. This distinction is founded on the degree of generality of the subject of the proposition. The following are examples of the four classes:—

All men are Mortal	Universal.
Some men are mortal	Particular.
Man is mortal	Indefinite.
Julius Cæsar is mortal	Singular.

[¶2] The proposition is *singular*, when the subject is an individual name. It is not necessary that the individual name should be a proper name: "The founder of Christianity was crucified," is as much entitled to the name of a singular proposition as "Christ was crucified."

[¶3] When the subject of the proposition is a general name, it may either stand for *all* that it denotes or only for a part. Thus, *man* may either stand for all men, or only for some men. When the predicate is affirmed or denied of all and each of the things denoted by the subject, the proposition is universal. When of some non-assignable number of them only, the proposition is particular. Thus, All men are mortal, Every man is mortal, are universal propositions, because the predicate *mortal* is affirmed of each and every individual denoted by the term man. No man is immortal, is also a universal proposition, since the predicate *immortal* is denied of each and every individual denoted by the term man: the negative proposition, being exactly equivalent to the following, "Every man is not-mortal." But "Some men are wise," "Some men are not wise," are particular propositions:

the predicate *wise* being in the one case affirmed and in the other denied, not of each and every individual denoted by the term man, but only of each and every one of an unspecified portion of those individuals.

[¶4] When it is not clear from the form of the expression whether the general name which is the subject of the proposition stands for all the individuals denoted by it, or only for some of them, the proposition is called *indefinite*: but this, as Dr. Whately has observed, is an absurdity of the same kind as that committed by some grammarians, when, in their list of genders, they enumerate the *doubtful* gender. The whole truth in respect to an indefinite proposition is, that the form of the expression does not shew whether its author means to assert a universal proposition or a particular one: but we know that he must mean to assert either the one or the other. And very often, though the words themselves do not shew which he intends, the context or the usage of the language supplies the deficiency. Thus, when it is affirmed that "Man is mortal:" nobody ever doubts that the assertion is intended of *all men*, and the word indicative of universality is commonly omitted, only because the meaning is evident without it.

[¶5] When a general name thus stands for each & every individual which it is a name of, or in other words denotes, it is said by Logicians to be *distributed*, or employed *distributively*. [¶6] These terms enable us to express very concisely the definitions already given of a universal and of a particular proposition. A universal proposition is that of which the subject is distributed; a particular proposition is that of which the subject is undistributed. The words *distributed* and *undistributed* are of great service in stating and demonstrating the rules of the Syllogism, as those rules have been commonly conceived. The view which will be taken in this work of the nature of the Syllogism renders these technical expressions less indispensable; but they are still very convenient for a variety of purposes.

[¶7] There are many other distinctions among propositions; but for explaining and illustrating these, in so far as their importance may render it desirable, more suitable opportunities will occur.

[Chapter v: Of the Import of Propositions*]

[§1]

[¶6] We are now prepared to analyse the meaning of Propositions: to inquire into the nature of the immediate object of belief; into the nature of an *assertion* or *judgment*; or of the *matter of fact* signified by a proposition. In other words, we are about to inquire, What is that which is expressed by the form of discourse called a proposition, and the conformity of which to fact, constitutes the truth of the proposition.

[§2]

[¶1] One of the closest and most consecutive thinkers whom this country, or the world itself, has produced, I mean Hobbes, has given the following answer to this question. In every proposition, he says, what is really asserted is, that the predicate is the name of the same thing of which the subject is the name; and if it really be so, the proposition is true. Thus, the proposition, All men are living beings, is true (he would say) because *living being* is a name of everything of which *man* is a name. All men are six feet high, is not true, because *six feet high* is not a name of everything (though it is of some things) of which man is a name.

[¶2] That what is here given as the definition of a true proposition, is a property really belonging to all true propositions, must be admitted: but not that it is any explanation of what we mean when we call a proposition true.

That all true propositions have the property ascribed to them by Hobbes is evident, since the subject and predicate being both names of things, if these things were wholly different, the one name could not, consistently with its signification, be predicated of the other. It could not be true, that Some men are black, unless among the individuals denoted by the name man, there were some who are also included among the individuals denoted by the name black. It would not be true that All oxen ruminate, unless all the individuals denoted by the name *ox*, were included among the individuals denoted by the name ruminating.

[¶3] Hobbes's definition, therefore, of a true proposition, contains nothing erroneous. But it fails in this; that it gives altogether an inadequate notion of what the truth of the proposition depends upon—of what the proposition really asserts.

[¶4] The only propositions of which Hobbes's definition can be admitted as a sufficient explanation, are that very limited and unimportant class, in which both the subject and the predicate are proper names. For, as has already been remarked, proper names have strictly no meaning; they are merely marks for individual objects: and when a proper name is predicated of another proper name, all the meaning conveyed is that both the names are marks for the same object. But this is precisely what Hobbes produces as a theory of predication in general. This doctrine is a full and satisfactory explanation of such predications as these, Hyde was Clarendon, or Tully is Cicero. It exhausts the whole meaning

[**There is no chapter break here in the Early Draft.*]

of these propositions. But it is a sadly inadequate theory of any others. That it should ever have been thought of as such, can be accounted for only by the fact, that Hobbes, in common with the other Nominalists, entirely overlooked the *connotation* of words; and sought for their meaning exclusively in what they *de*note: fancying that all names were (what none but proper names really are), marks put upon individuals; and seeing no difference between a proper name and a general name, except that the first denotes only one individual, and the last a greater number. It was the natural consequence of such views that a theory of predication which only suits the case in which both terms of the proposition are proper names, should be brought forward to explain predication in all cases whatever.

[¶5] We, however, have shewn, that the meaning of all names, except *proper* and *abstract* names, resides in the connotation. When, therefore, we are analysing the meaning of any proposition, of which the predicate and subject are neither proper nor abstract names, it is to the connotation of those terms that we must exclusively look, and not to what they denote, or, in Hobbes's language, to what they are names of.

[¶7] A man, or a bird, or a stone, means simply an object having such and such attributes. The real meaning of the word man, is those attributes, and not John, Peter, Thomas, &c. The word *mortal*, in like manner, connotes certain attributes: and when we say, All men are mortal, the meaning of the proposition is, that all beings which possess the one set of attributes, possess also the other. If, in our experience, the attributes connoted by *man* are found to be always accompanied by the attributes connoted by *mortal*, it will follow, as a necessary consequence, that the class *man* will be wholly included in the class *mortal*, or that *mortal* will be a name of all things of which *man* is a name: for why? those objects are brought under the name, by our having discovered that they possess the attributes connoted by it: but their possession of the attributes is the fundamental fact on which the truth of the proposition depends; not their being called by the name. Connotative names always follow the attributes which they connote. If any two attributes happen to be conjoined, whether it be in one instance only or in all instances, the concrete names answering to those attributes will of course be predicable of the same subject, and may be said in Hobbes's language (in the propriety of which I fully concur) to be two names for the same thing. But the coincidence in the application of the two names is a mere consequence of the conjunction between the attributes; and was, very likely, never thought of, when the names were invented, and their signification fixed. That the diamond is combustible was a proposition certainly not dreamt of when the words diamond and combustible received their present meaning; and could not have been discovered by the most ingenious and refined analysis of those words. It was found out by a very different process, viz: by exerting the five senses, and learning from them, that the attribute of combustibility existed in all those diamonds upon which the experiment was tried; these being so numerous, and the circumstances of the experiment being such, that what was true of those individuals might be concluded to be true of all substances *coming within the name*, that is, of all substances possessing the attributes which it connotes. The assertion, therefore, when analysed, is, that wheresoever we find certain attributes, we shall find a certain other attribute. And this is not a question of the signification of names, but of the laws of nature; the order which exists among phenomena.

[§3]

[¶1] Although Hobbes's theory of Predication has not, in the words in which he stated it, met with a very favourable reception from philosophers; a theory precisely identical with it, and not by any means so perspicaciously expressed, may almost be said to have taken its place among established opinions. The most generally received notion of what Predication is, among those who have attempted to consider it metaphysically, is decidedly this—that it consists in placing something in a class; i.e. either placing one class under another class, or placing an individual under a class. Thus, the proposition Man is mortal, asserts according to this view of it, that the class man is included in the class mortal. "Plato was a philosopher," asserts that the individual Plato was one of those who compose the class philosopher. If the proposition is negative, then, instead of placing something in a class, it excludes something from a class. Thus, if the following be the proposition, The Elephant is not carnivorous; what this proposition asserts is, that the elephant is excluded from the class carnivorous, or is not numbered among the things which compose that class.

When we consider that a class is absolutely nothing but an indefinite number of individuals denoted by a general name, the identity of this theory with that of Hobbes is too manifest to require elucidation. [¶2] How widely these views have prevailed, is evident from the fact, that they are the basis of the celebrated *dictum de omni et nullo*. When the syllogism is resolved by all those who treat of it, into an inference that what is true of a whole class, is true of all things whatever belonging to that class; and when this is almost universally laid down by logicians as the principle upon which all reasoning ultimately rests; it is clear that in the general estimation of logicians, the propositions, of which reasonings are composed, can be the expression of nothing but the process of dividing things into classes, and referring every object to its proper class.

[¶3] I cannot but consider this theory to be both unsatisfactory and illogical. Unsatisfactory, because we have already seen that by digging deeper for a solution, a more complete one may be found. Illogical, because instead of explaining the effect by the cause, it explains the cause by the effect. It is I conceive founded upon a latent misconception of the nature of classification.

[¶4] It seems to be supposed that classification is an arrangement and grouping of definite and known individuals: That when names were imposed, an inventory was made of all the objects in the universe, and these being divided into parcels or lists, a name was given to each list to be common to all the objects in it; in the same manner, (allowance being made for the difference between a name of one individual & a name of more than one) in which a man gives a name to each of his children, to distinguish them from one another: That the objects were then brought again into a common stock, & rearranged on some other principle, each of the new lists having also a name given to it; and so on; until all the general names in our language had been arrived at. This having been done; if a question subsequently arises whether a certain general name can be truly predicated of any particular object, we have only to consult our former proceedings, and see whether that object is to be found in the list corresponding to that name. It has been predetermined by the inventors of language what individual objects each class shall consist of; and all we have to do is to refer to the record of an antecedent decision.

[¶5] When broadly stated, this seems ridiculous enough. But it is curious to

observe how closely the received explanations of classification and naming are related to this absurd theory: and how well calculated they are to introduce into the mind, though indistinctly yet so much the more effectually, this very idea.

[¶6] General names are not marks put upon definite objects. Classes are not made by drawing a line round a certain number of given individuals. The objects which compose any given class are perpetually fluctuating. We may frame a class, without knowing even one of the individuals composing it; we may do so, believing that no such individuals exist. If by the *meaning* of a general name are to be understood the things which it is the name of, or which it *de*notes, no general name, except by accident, has any fixed meaning at all. The meaning of a general name resides exclusively in what it *connotes*. The only mode in which any general name has a definite meaning, is in being a name of all things, known and unknown, past, present, or future, which possess certain definite *attributes*. When, by studying not the meaning of words, but the phenomena of nature, we discover that the attributes in question are possessed by some objects not previously known to possess them,—as was the case when chemists found out that the diamond was combustible,—we then include the object in the class: but it did not *already* belong to the class. We place the individual in the class, because the proposition is true: the proposition is not true because the object falls within the class.

[¶7] It is of some importance to enter thus fully into the analysis of these theories of Predication, as the logical habit in which they originate is very widely diffused; and it is to the influence of this habit I must ascribe the fact that notwithstanding the great advances which have been made in the analytical study of the mind since the days of the Schoolmen, the theory of logic has, in my opinion, actually retrograded since that time. The habit which I allude to, is that of assimilating all the operations of the human understanding which have Truth for their object, namely, the assent to it, & the demonstration of it, [*]to processes of mere classification and naming.

When we come to treat of Reasoning, we shall, I think, be convinced how much the theory of that intellectual process has been vitiated by the influence of the views which I have just been combating. [¶8] I have only further to remark in this place, that, although Hobbes's theory of predication, as Leibnitz pointed out, renders truth and falsity perfectly arbitrary, without any standard but the will of man, it must not be concluded that either Hobbes, or any of the other philosophers who have in the main agreed with him, did in fact consider the distinction between truth and error as less real, or attached one jot less importance to it, than other people. To suppose that they did so, would argue total unacquaintance with their other speculations. But this shews how little hold their doctrine possessed even over their own minds. No person, at bottom, ever imagined that there was nothing more in truth than mere propriety of expression; than using language in conformity to a previous convention. With whatever illusions even profound thinkers may have contrived to satisfy themselves when endeavouring to find a general solution for a great metaphysical problem,—when they came to the practical application of their doctrines, they were always prepared with some means of explaining the solution away. When the inquiry was brought down from generals to a particular case, every one has always acknowledged a distinction between *verbal* questions & *real* questions; has freely admitted that *some*

[**Gathering* F *begins here.*]

false propositions are uttered from ignorance of the meaning of words, but in others the source of the error is in *things*: that in the former case, there is no impropriety in saying, that the assertion *intended* is true, and the falsity lies in the words only: That a person who has not the use of language may form true propositions mentally, that is, he may believe matters of fact. [*]No doubt, indeed, when the matter of fact is correctly conceived in my mind, and my opinion or judgment is strictly true, if I attempt to put that opinion into words, I may, from ignorance of their conventional meaning, convey a false proposition instead of a true one. The question whether I have correctly *expressed* a *given* matter of fact, or what are the words I must use for the correct expression of it, is a question of naming, entirely. But this is no philosophical discovery. Every child knows that the *mode of putting a truth into words* depends upon the meaning of words; and Hobbes's definition must shrink into the dimensions of this barren truism, in order to be true at all.

The ease with which what would satisfy nobody if brought to explain what constitutes the truth of any one fact, is accepted as a perfectly satisfactory solution of the nature of Truth in general, merits particular attention; & adds one more to the numerous examples which shew that the chances of error in our speculations are nearly in direct proportion to their generality.

The countenance which this particular error derives from an imperfect conception of the distinction between *essential* and *accidental* propositions, & from a misapprehension of the nature of mathematical reasoning, and in particular of the algebraic calculus, will fall under our notice, in another place. Hereafter, also, in treating of classification and naming, it will still more clearly appear that these operations are completely arbitrary; that their sole object is convenience; and that instead of determining the truth of propositions, they bend to it, and, in all cases, shape and mould themselves according to those judgments, of which propositions are the expression. That, in short, we name & classify things according to their attributes; & do not ascribe attributes to them in obedience to a previous meaning and classification.

In combating the superficial views of some philosophers on the nature of Predication, we have already done nearly everything which is necessary for shewing what Predication really is.

The Predicate of a Proposition must be either a proper name, or a connotative name, or an abstract name.

A proper name being merely an unmeaning mark used to speak of an object by; in predicating of any object a proper name, we convey no meaning, we express belief in nothing, except only that *this is* the object which it is a mark of. If the proposition is negative instead of being affirmative, the assertion conveyed is, that this is not the object which the proper name is a mark for. It is of no consequence what kind of name forms the *subject* of the proposition. It must, indeed, be an individual name, otherwise the proposition would be neither true nor false, but simply unmeaning. "The father of Socrates was Sophroniscus," is a true proposition: "Pericles was Sophroniscus," is a false proposition; but "All men were Sophroniscus," can hardly be called a *false* proposition, nor "Some men were not Sophroniscus" a true one; both are simple nonsense: they are a kind of solecisms in language. For nothing of which the human mind can frame

[**From this point to* p. 1016, *the matter was completely revised (partly as a result of the revisions of* Chap. iii *above) to produce* Chap. v, §§4–7, *and the first two-and-one-half paragraphs of* Chap. vi. *Two paragraphs, as indicated, contributed directly to* Chap. v, §4.]

a conception, is affirmed in the one case, or denied in the other. The propositions are equivalent to these: "many men are one man:" "many men are not one man:" now what image do these sentences raise in the mind, more than if the words were read backwards? No more than Abracadabra. We cannot predicate a proper name of a general name, either *truely* or *falsely*; such a predication is mere gibberish. But the subject of the proposition, so long as it is only the name of one individual, may be either proper or connotative. In both cases, equally, the subject of the proposition is simply this, that the individual, in whatever manner designated, who is denoted by the subject, bears or does not bear the name which is the predicate.

The case is very different when the predicate is a connotative name. When that is predicated of any object individually designated, there is always asserted a *matter of fact*, distinct from the mere meaning of a name. This matter of fact is, that the object thus individually pointed out, possesses the particular *attributes* connoted by the connotative names.

[§4, ¶1] When, therefore, the subject is a proper name, and the predicate a connotative one, the proposition, if affirmative, asserts that an *individual*, to be known by a particular mark which has been put upon it, possesses the *attributes* connoted by the predicate. From the analysis of attributes, it will be remembered that this means that the said individual excites in our minds & those of others, certain sensations or other states of consciousness; or, if itself a sentient being, experiences certain sensations or other states of consciousness.

The subject as well as the predicate may be a connotative name. And this is the most important of all the cases; as it comprehends all general propositions, except those in which the subject is an abstract name.

[§4, ¶2] In this case, as in the last, what the proposition asserts or expresses a belief in, is, of course, that the objects *de*noted by the subject possess the attributes *connoted* by the predicate. But the characteristic of this case is that the objects are not *individually* designated. They are pointed out only by some of their attributes: and the only thing known of them may be those attributes: in the case of a general proposition, the objects denoted by the subject being indefinite in number, some of them are not known individually at all. The assertion, therefore, is not that the attributes connoted by the predicate are possessed by any individual or any number of individuals known previously as John, Thomas, Richard, &c. but that those attributes are possessed by each & every individual possessing certain other attributes; in other words, that one set of attributes is *constantly conjoined* with another set.

It is easy to accommodate this explanation to the diversities of universal, particular, and singular, of affirmative and negative propositions: thus:

All men are mortal, signifies that the attribute connoted by *mortal*, constantly accompanies the attributes connoted by *man*. In other words, that all objects which have the attributes connoted by *man* have likewise the attributes connoted by *mortal*. Or, again changing the expression; that all objects which excite and experience the sensations connoted by *man*, excite and experience the sensations connoted by *mortal*. (I use the word sensations merely for shortness; the entire phrase would be, sensations, thoughts, emotions, and volitions.)

Some men have black hair, means, that the attribute connoted by "having black hair," *sometimes* accompanies the attributes connoted by *man*. Or that *some* objects which have the attributes connoted by *man*, have also the attribute connoted by *having black hair*. Or that *some* objects which excite and experience

the sensations connoted by *man*, excite also the sensations connoted by *having black hair*.

The Archbishop of Canterbury has black hair, means, that the attribute connoted by *having black hair*, accompanies the attributes connoted by *Archbishop of Canterbury*, in the single instance of the individual at present possessing those attributes, to whom the assertion is limited, by the particle *the*, which also marks that there is but *one* such individual.

The same analysis will hold, with the necessary variations, in the case of negative propositions.

No birds are four-footed, signifies that the attribute connoted by *four-footed*, never accompanies the attributes connoted by *bird*. In other words, that none of the objects which have the attribute connoted by *bird*, have the attributes connoted by *four-footed*. Or finally, that of the objects that excite and experience the sensations which the name *bird* connotes as being experienced & excited, there is not one which excites, in addition, the sensations connoted by the name *four-footed*.

Some men are not mathematicians, signifies, that the attribute connoted by *mathematician*, does not always accompany the attributes connoted by *man*. Or that some of the objects which have the attributes connoted by *man*, have not that which is connoted by *mathematician*: Or that some of the objects which excite and experience the sensations connoted by *man*, do not excite and experience the sensations connoted by *mathematician*.

The first navigator was not a mathematician, means that the attribute connoted by *mathematician*, did not accompany the attributes connoted by *navigator*, in the first instance in which those attributes ever existed; or, to put the same meaning into another form, do not accompany the attributes connoted by *first navigator*, one of which attributes is that of being the only individual of its class.

In all these cases I repeat that the word sensation is used as the representative of all states of consciousness whatever; though it is a name properly belonging only to what are commonly but incorrectly called *bodily feelings*, meaning such as can be proved to be *organic*. The exact import of this word, it is not necessary to discuss, except in a work, treating either of physiology, or of metaphysics. The word sensation has been adopted in the above analysis merely to avoid complicating the sentence with four words instead of one.

The truth, then, of a general proposition of which the subject and predicate are connotative names, depends upon a fact ascertainable by experience, viz: whether certain phenomena, of the external senses or of external consciousness, do or do not constantly accompany certain other phenomena, either in all or in some of their combinations. The word attribute, when so understood as not to suggest the notion of an occult cause, affords the most compact and concise phraseology for expressing the conclusion at which we have arrived. We may, therefore, state as the final result of this portion of our inquiry into the nature of predication, the following maxims:

Every general proposition of which the subject and predicate are connotative names, either *affirms* or *denies*, that either *all* or *some* of the objects possessing the attributes connoted by the subject, possess also the attributes connoted by the predicate.

If the two sets of attributes *are* thus conjoined in all or some of those objects, the affirmative proposition is true and the negative false; if they are *not* so conjoined, the negative proposition is true and the affirmative false.

[Chapter vi: Of Propositions Merely Verbal*]

[§*1*]

[¶*3*] This leads us to a distinction of very great practical importance; the distinction between *essential* and *accidental* propositions, and between essential and accidental properties or attributes.

[§2]

[¶1] The Schoolmen, and most other philosophers prior to Locke, as well as many since his time, have made a great mystery of what they called essential predication, being that in which the predicate was of the *essence* of the subject: meaning, as they said, by its essence, that without which it could neither be, nor be conceived to be. Thus, *rationality*, they said, was of the essence of man, because, without rationality, man could not be conceived to exist. It is not necessary here to state particularly the connexion which this distinction had with the doctrines of *substantiæ secundæ*, or universal substances, and *substantial forms*, doctrines which under varieties of phraseology, pervaded alike the Aristotelian and the Platonic Schools. I allude to these dogmas of the Realists, which were the technical expression of the erroneous notion that genera and species are made by nature, and cannot be altered for man's convenience, merely because these false views of the nature of classification & generalization, satisfactorily account for what would otherwise be inexplicable, viz: that the Schoolmen should not have seen what is so extremely obvious, as the real nature of those essences which held so conspicuous a place in their philosophy. They said truly, that *man* cannot be conceived without rationality. But we can conceive an animal exactly like a man, in all except that one quality, and those others which are the consequences of it. All, therefore, which is really true in the assertion, that man could not be conceived without rationality, is only, that if he had not rationality, he would not be reputed a man. There is no impossibility in conceiving the *thing*: nor, for aught we know, is there any impossibility in its existing: the impossibility is only in the conventions of language, which will not allow the thing, even if it exist, to be called by the name which is reserved for rational beings. Rationality, in short, is involved in the meaning of the word *man*: it is one of the attributes connoted by that name. The essence, therefore, of man, simply meant the whole of the attributes connoted by the word. And any one of these attributes, taken singly, may be called an *essential property of man*.*

[**There is no chapter break here in the Early Draft.*]

*[*Cf.* 111*c*.] Porphyry approached within so short a distance of the true theory of *essences*, in his Isagoge, that one step only remained to be made, but this one step, however easy in appearance, it was reserved for the Nominalists of modern times to make. *Καθόλου μὲν οὖν πᾶσα διαφορὰ προσγινομένη τινὶ ἑτερôιον ποιεῖ· ἀλλ' ἀι μὲν κοινῶς τε καὶ ἰδίως* (differences in the accidental properties) *ἀλλοῖον ποιοῦσιν· ἀι δὲ ἰδιαίτατα* (differences in the essential properties) *ἄλλο*. (Porph. Isag. cap. iii.) By altering any property not of the essence of the thing, you merely, according to Porphyry, made a difference in it; but by altering any property which was of its essence, you made it *another thing*.

To a modern it is obvious that between the change which only makes the thing different, & the change which makes it *another thing*, the only distinction is that in the

[¶3] Now, as the most familiar of the general names predicable of an object, in most cases connote not one only, but several of the attributes of object [*sic*]; each of which attributes may also be taken separately to form the bond of union of some class, and the meaning of some general name; it is obvious that we may predicate of a name connoting a variety of attributes, another name which connotes only one of those attributes, or some smaller number of them than all. In such cases, the universal affirmative proposition will be true; it being self-evident, that every object which possesses the whole of any set of attributes, must possess a part of that same set. In such cases, however, the proposition conveys no information, to any person who previously understood the whole meaning of the terms. The propositions, Every man is a corporeal being, Every man is an animal, Every man is rational, convey no knowledge to any one, who was already perfectly aware of the entire meaning of the word *man*; for the meaning of the word *man* includes all this: and, that every man has the attributes connoted by these different predicates, is already asserted when he is called a *man*. Now, of this nature are all the propositions which have been called *essential* propositions. They are accordingly, in fact, *identical* propositions.

[¶4] Every proposition, indeed, which ascribes any attribute to the thing denoted by a name, involves, it is true, a tacit assertion that there really *exists* a thing corresponding to the name, and possessing the attributes which it connotes; and *this*, no doubt, may convey information, even to those who perfectly understood the meaning of the name. But all the information of this sort which is conveyed by all the essential propositions of which man can be made the subject, are included in the single assertion, Men exist. And this assumption of real existence is only the result of an imperfection of language. It arises from the ambiguity of the copula, which in addition to its proper function of a mark to shew that there is a predication, is also, as we have already remarked, a concrete word, connoting existence. The actual existence of the subject of the proposition is only apparently, not really, implied in the predication, if an essential one; for we may say, A ghost is a disembodied spirit, without believing in ghosts. But every proposition not essential *does* imply the real existence of the subject, or else the proposition is mere non-sense. Thus, the proposition, The ghost of a murdered person haunts the couch of the murderer, can only have a meaning, if understood as signifying a belief in ghosts; since the attribute predicated is clearly not implied in the signification of the word ghost: unless, therefore, the speaker intends to express a fact or phenomenon, which really takes place, he expresses nothing more than if he uttered inarticulate sounds.

[¶5] It will be shewn, in a subsequent place, that whenever any important

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one case, though changed, it is still called by the same name. Thus, pound ice in a mortar, & as it is still called ice, it is only made ἀλλοῖον; melt it, & it becomes ἄλλο, another thing, namely water. But it is the same thing, *i.e.* the same particles of matter, in both cases; & you cannot so change anything, that it shall cease to be the same thing, in this sense. The identity which you *can* take away is merely that of the name: when the thing ceases to be called ice, it is become ἄλλο, its essence is gone: while it continues to be so called, nothing is gone but some of its *accidents*.

[¶2] But these reflexions, so easy to us, would have been difficult to people who thought that objects were made to be what they were, that ice for instance was made ice, not by the possession of certain properties to which we chuse to attach that name, but by participation in the nature of a certain *universal substance* called *Ice in general*. [*This note was added in JSM's hand on the opposite verso.*]

consequences appear to flow, as in mathematics, from an essential proposition, or a proposition deduceable from the meaning of a name, it is from this tacit assumption of the real existence of the object so named, that these consequences really flow. Apart from this assumption of real existence, propositions in which the predicate is of the essence of the subject, that is, in which the predicate connotes the whole or part of what the subject connotes, but nothing besides, answer no purpose except that of unfolding the whole or some part of the meaning of the name which is the subject, to those who did not previously know it. Accordingly, the most useful class of essential propositions are Definitions, which, to be complete, should unfold the *whole* of what is involved in the meaning of the word defined, i.e. the whole of what it connotes. But it is usual, in defining a name, not to indicate all the attributes which it connoted, but only so many of them as are sufficient to segregate all the known objects denoted by it, from all other known objects. And sometimes some merely accidental property, not involved in the meaning of the name at all, answers this purpose equally well. The various kinds of Definition which these distinctions give rise to, and the purposes to which they are respectively subservient, will be minutely considered in the proper place.

[§3]

[¶1] According to the above view of essential propositions, no proposition is essential which relates to an individual by name, i.e. to a proper name. This is a deviation from the language of the Schoolmen. They regarded everything as of the essence of an individual, which was of the essence of the *species* to which they were accustomed to refer that individual; that is of the class to which it was most familiarly referred, & to which, therefore, they conceived, that it by nature belonged. Thus, because the proposition *Man is a rational being*, was an essential proposition, they held this to be the case likewise with the proposition, *Julius Cæsar is a rational being*. This naturally followed if genera and species were to be considered as entities distinct from the individuals composing them. If *man* was a substance *inhering* in every individual man, it was natural to conclude that the *essence* of man was something inherent in *man*, and by necessary consequence inherent in all individual men and forming their common essence. It might then be said that rationality was not only of the essence of man, but of the essence of Julius Cæsar. But this expression has no meaning when severed from the metaphysical theory out of which it grew.

[¶2] A fundamental error, however, is seldom expelled from philosophy by a single victory. It retreats slowly, defends obstinately every inch of ground, and often retains a firm footing in some difficult fastness, after the whole of the open country has been wrested from it. The *essences* of individuals were an absurd figment arising entirely out of a misapprehension of the essences of classes, yet so profound a philosopher as Locke, when he discarded the parent error, still held fast to that which was its offspring. He divided essences into two classes, *real* and *nominal* essences. Real essences were the essences of individual objects: these, he says, are the causes of the sensible properties of objects. What they are we do not know, but if we did, from them alone, we could demonstrate the sensible properties of the object, just as we demonstrate the properties of the triangle from the definition of the triangle. The nominal essences of Locke were the essences of classes, explained nearly as we have explained them; in short, the

connotation of general names. Nor is anything wanting to render the third book of Locke's Essay a nearly perfect treatise on the connotation of names, except to disengage it from the assumption of *abstract ideas*, which unfortunately is inextricably mixed up in all his language, but not in the thoughts of which that language is in every other respect the appropriate expression. Because a name may be given to an object to signify some only of the properties of the object; Locke concluded that we may have an idea of those properties by themselves, independently of any others: and he always spoke of the name as expressing that *idea* of the properties, & not the properties themselves. This extremely vicious phraseology has had a most unfortunate influence upon the fate of his speculations; for when Berkeley afterwards pointed out that these pretended abstract ideas do not exist; and that all our ideas are "clothed in circumstances" and are in fact ideas of individuals more or less completely conceived, philosophers ceased to attend to those observations of Locke on the meaning of words, which appeared to involve a theory subsequently recognized as erroneous, and went off into pure Nominalism, from which the speculations of Locke, if properly understood, would have preserved them. And what is still more remarkable, the blindest admirers of Locke, whose doctrines on many subjects are a mere caricature of his, the school of Condillac and Helvetius,[*] although they retained the exploded part of Locke's system, the doctrine of abstract ideas, benefitted no more than other people by any of the other doctrines of that immortal third Book, in which the only flaw of importance, unless I am mistaken, is that erroneous theory.

[§4]

[¶1] Propositions not essential are called *accidental*. An accidental attribute of a class, is any attribute not involved in the signification of the general name appropriated to that class,—or in the precise and convenient language to which we have hitherto adhered, any attribute not *connoted* by the name. All general propositions, in which the predicate connotes any attribute not connoted by the subject, are accidental propositions. All such propositions, if true, add to our knowledge; they convey other information than that which is involved in the names employed. When I am told that all objects (or even some objects) which have certain qualities, or which stand in certain relations, have also certain other qualities or stand in certain other relations, not the same with any of those first mentioned, I learn from this proposition a new fact; a fact not included in, nor deducible from, my knowledge of the meaning of the words, nor even of the existence of things answering to the signification of those words. It is this class of propositions only, which are in themselves instructive, or from which any instructive propositions can be inferred.

[¶2] There is nothing which seems likely so greatly to have contributed to the general opinion so commonly prevalent, of the futility of the school logic, as the circumstance that almost all the examples used in the common school books to illustrate the doctrines of Predication & of the Syllogism, consist of essential propositions. They are usually taken either from the branches or from the main trunk of the Predicamental tree, which included nothing but what was of the *essence* of the species. Such were, *Omne corpus est substantia*, *Omne animal est*

[**At this point JSM cancelled the following passage:* than whom if some theorists have deviated further from the truth, none probably have been more superficial and precipitate—this ideological school,]

corpus, Omnis homo est corpus, Omnis homo est animal, Omnis homo est rationalis, & so forth. It is scarcely to be wondered at, that the rules of the syllogistic process should have been thought to be of no use in assisting correct reasoning, when the only propositions, which, in the hands of its professed teachers, it seemed to be employed to prove, were such as every one assented to without proof the moment he comprehended the meaning of the words. I have therefore throughout this work, studiously avoided the employment of essential propositions as examples, except where the nature of the principle to be illustrated particularly required them.

[*]We have now concluded our analysis of those kinds of Predication, in which the subject and predicate are concrete names. The only remaining kind of names are *abstract* names, or those which instead of *de*noting an object and *con*noting an attribute, denote the attribute itself directly: in other words, denote a certain combination or succession of states of consciousness, implying at the same time that these are excited by some object which is not specified.[†]

[**From this point to* p. 1029, *the matter was completely revised (partly as a result of the revisions of* Chaps. iii *and* v *above) to produce* Chap. vi, §5, *and* Chap. vii, §1. *Three places where there is a direct relation are indicated in notes.*]

[†*At this point the following cancelled passage, which concludes Gathering* F *(the final folio of which is some five lines short), appears in the MS; see* p. 956 *above.*

The predications which take place wholly or partly by means of this class of names, are those which it still remains for us to analyse.

An abstract name can never be predicated of a concrete one. It would evidently be absurd to say that an object is a quality, or an object is a relation. An attribute is an impression upon our consciousness, considered with reference to the body or mind which excites, or to the mind which experiences it. An object is either a body; or a mind; or a feeling, a state of consciousness considered merely in itself, and without reference to the mind which is conscious of it, or to any other mind which contemplates it. It clearly could not conduce to the ends of language to couple these two kinds of words together in a predication. There is nothing in common between the notion of an object & the notion of an attribute. An object *possesses* attributes; and this we express by predicating of the object, the concrete names which denote those attributes. But to say that an object *is* an attribute, would be to utter a proposition which is not true, nor even false. For when we say that a proposition is false, we mean that it contains some assertion; that it expresses a belief in something, although that something does not happen to be conformable to the fact. It is false that the three angles of a triangle are equal to five-and-twenty right angles. But a person, knowing the meaning of the words, might possibly believe, although erroneously, that this proposition is true. But what would he express a belief in, if he said that an object was an attribute? What intelligible error or falsehood do we contradict in saying that an object is not an attribute? Neither truth nor falsehood can exist beyond the bounds of the intelligible.

Though an abstract name cannot be predicated of a concrete one, a concrete name may, in certain cases, be predicated of an abstract one. It would be as absurd, certainly, to say that an attribute is an object, as to say that an object is an attribute. But we may say that an attribute stands in a relation to an object, or to another attribute. An attribute is the attribute *of* an object: it may be the *cause* of an object, or of another attribute; it may be the *effect* of an object or of an attribute: it may *precede, follow*, or *accompany* an object or an attribute: it may *resemble* another attribute. We have seen in a former place that it is consistent with the usage of language to ascribe *relations* to an *attribute*, as well as to a substance. We may consequently predicate of the abstract name which expresses an attribute, the concrete name which connotes a relation. Moreover, the contemplation of an attribute, may, like the contemplation of an object, excite certain feelings in the mind. But to excite in the mind a certain feeling, is that

[*]These are of two kinds; those in which both the subject & predicate are abstract names; and those in which the subject is an abstract and the predicate a concrete name. There is no class of propositions in which the subject is a concrete & the predicate an abstract name. An abstract name cannot be predicated of a concrete. A concrete name is the name of an object; a body or mind; or else, the name of a feeling, considered merely in itself, & without being referred to any object, as its source. It would be absurd to predicate of any of these things, the name of an attribute. It would be absurd to say that an object is a quality, or that an object is a relation; that a sensation is a quality, or that a sensation is a relation. It would not conduce to the ends of language to couple words together in

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sort of attribute which we have termed a quality. An attribute, therefore, may have qualities; and we may predicate of the abstract name which expresses an attribute the concrete name which connotes a quality. Thus, we may say with acknowledged propriety, Her beauty is delightful; just as we say, Her person is delightful. In this case, the predicate connotes a quality. In the following proposition, His thoughtlessness is dangerous, the predicate connotes a relation: for *dangerous* means that which is a probable cause of evil or inconvenience to some sentient being.

It is evident, therefore, that the fact which is asserted, when a concrete name is predicated of an abstract one, is exactly the same kind of fact which we assert when one concrete name is predicated of another. In many cases, it is not the same *kind* of fact only, but the very same fact. Thus, when we say that one sensible quality is *like* another, what is it but to say, that one sensation is like another.

There are various modes in which a proposition composed of abstract names, may be translated into a proposition composed of concrete ones. There is one mode in particular by which any proposition relating to an attribute, may be changed into an equivalent proposition relating to the objects possessing the attribute. The latter proposition in this case is of a peculiar form, which is best displayed by means of examples. Thus, *Courage is deserving of honour*, is a proposition equal to this, All courageous persons, *so far forth as they are courageous*, are deserving of honour. Which is evidently the same proposition as this, All persons who are courageous, deserve an addition to the honour, or a diminution of the disgrace which may attach to them from other causes. Again, *Virtue is beneficial to Society*, is equivalent to, All virtuous persons, *so far forth as they are virtuous*, are beneficial to Society: or to this, All virtuous persons produce, *cæteris paribus*, greater benefit to Society, than persons who are not virtuous.

The class of facts asserted in this class of predications will fall under particular consideration, when, in treating of Induction, we come to speak of the cases in which the result sought is the sum or difference of the separate results of several different laws. Nor is it possible to analyse attributes any further until we have shewn, as we shall do in the chapter on induction, what is the nature of Experience. At present it is enough to have shewn, that the general view of the nature of those predications in which the subject is a concrete name will serve equally for those in which the subject is an abstract name, the predicate alone being concrete: every such proposition being exactly equivalent to some proposition consisting of no other than concrete names.

We have now disposed of the predications in which both the terms are concrete, & of those in which one of the terms is concrete & the other abstract. The only case remaining is that in which both the subject and predicate are abstract names.

Propositions of which both the terms are names of attributes, are of two kinds, which may be termed *essential* & *accidental*.

If the attribute signified by the subject be itself a union of several attributes, the names which belong to these attributes, taken separately, may be joined, & predicated of the name belonging to them all taken together. We shall thus obtain the definition of

[**Gathering* G *begins here. Gatherings* G *through* J *are in Scribe B's hand.*]

such a mode. A predication of this sort would not be true, nor even false. For when we say that a proposition is false, we mean that it contains some assertion; that it expresses a belief in something, although that something does not appear to be conformable to fact: as, that three angles of a triangle are equal to ten right angles. But a predication such as those we have supposed, would not convey the notion of anything intelligible; not even an intelligible error or falsehood.

Though an abstract name cannot be predicated of a concrete one, a concrete name may in certain cases be predicated of an abstract one. It would be as absurd, certainly, to say of an attribute, that it is an object, as to say of an object that it is an attribute. But when we predicate of any thing a concrete connotative name, we do not thereby affirm that the thing of which the name is predicated is

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the attribute. For as we define a concrete name by enumerating the attributes which it connotes, and as the attributes connoted by a concrete name constitute the entire signification of the corresponding abstract one, the same enumeration will equally serve for the definition of the latter as well as of the former.

Even when the abstract name does not express a complication of attributes, but only one single attribute, yet if the phenomenon constituting that attribute be of a complex nature, consisting of several parts either coexistent or in succession, we may join together the names of the separate parts, and predicate them of the name of the whole. And this also will be a definition. Thus, eloquence might be defined, the power of influencing the affections of men by means of speech or writing.

It is not unusual to give to various attributes, as well as to various objects, a common name. There is first the general name *attribute*, which is common to all attributes. There are next the names of the two species of attributes, *quality* and *relation*. Finally there are the names of various kinds of quality & of relation, as *colour*, *dimension*, *virtue*, and so on; all which words may be predicated of the particular attributes classed under them; As, Whiteness is a colour, Height is a dimension, Courage is a virtue.

All these names, which signify not single attributes, but classes of attributes, are a sort of connotative names, & have been noticed as such in a former place. They may be said by a slight extension of the meaning which we have assigned to the two words, to *de*note attributes, and to *con*note an attribute of those attributes.

On what principle, in fact, are a number of different attributes grouped together in a class? It must be for one of two reasons. Either the attributes resemble each other; that is, the sensations or other states of consciousness which constitute those attributes resemble each other; or else, though not in themselves similar to one another, they stand in the same or a similar relation to something else; they may, for instance, agree in producing a certain effect. Thus, all virtues are so called because they agree in this, that they excite the sentiment of moral approbation in the mind. All colours agree in this, that they are perceived by the eye and not otherwise; and besides, the sensations themselves bear a certain resemblance to one another.

Now these names, *colour*, *dimension*, *virtue*, and the like, which are names of classes of attributes connote the circumstances, whatever they are, which have led to the formation of those classes. They denote each individual attribute, and connote either its resemblance to the other attributes of the same class; or its relation to something else (e.g. *virtue* connotes that whatever is so named, excites the feeling of moral approbation in the speaker's mind); or *both* its resemblance to the other attributes of the same class, & its relation to something else: as *colour*, when predicated of whiteness, connotes both the resemblance of that sensation to our other sensations of colour, & also that it is a sensation of sight.

We have now examined all the possible cases of Predication: and have found what, in all propositions whatever, is the assertion that is made; the matter of fact which is the object of belief.

Propositions, we have found, do not agreably to the doctrine of Hobbes, assert in all cases whatever only one kind of fact; namely, an agreement between the significa-

an object; we merely affirm, that it is something which possesses attributes, (namely, those attributes which the predicate connotes). Now an attribute as well as an object may possess attributes. Every name, therefore, which connotes attributes capable of being possessed by attributes, may be predicated of an abstract name. Thus we may predicate of an attribute, the relation in which it stands to any object of which it is an attribute, as when we say, whiteness is the colour of snow; Dissimulation is the quality of a coward. We may predicate of it names connotative of various other relations. An attribute, for instance, may be the *cause* of an object, of an attribute, of an event,* or of a feeling; as is expressed in the proposition, Philosophical instruction strengthens the intellect; wherein it is affirmed, that the attribute of being instructed in philosophy, *causes* or produces the attribute of intellectual strength. In like manner an attribute may be an effect; as in the last example, intellectual strength is asserted to be an effect of philosophical insruction.

[*]An attribute may *precede*, *follow*, or *accompany*, an object, an attribute, an event or a feeling. But the largest class of relations of attributes, are their mutual

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tions of two names. Propositions may, on the contrary, be divided into two species, of which one only answers to Hobbes's definition.

1st. Propositions containing assertions respecting the meaning of names; these are, propositions of which the predicate is a proper name; definitions, & other essential, or in other words, identical propositions.

And 2ndly. Propositions which either affirm or deny a fact of the following description. That two phenomena, cognizable by the external senses or by internal consciousness, occur in conjunction; i.e. that when a certain phenomenon takes place, a certain other phenomenon takes place likewise, either simultaneously or in succession, with or without an interval of time.

If it be now asked, what constitutes a true proposition; we can give no other answer, than the superficial one with which we commenced. The proposition is true, if the assertion contained in it, is conformable to the fact of which it professes to be the expression.

Having now, however, analysed the assertion contained in every proposition, and found that the fact asserted is either the identity of the meaning of two names, or the coexistence of two phenomena, we may, in consequence add to the general definition of a true proposition, a more particular description of what constitutes the truth of each of the two species into which propositions have just been divided.

A proposition, therefore, which asserts that one name connotes or denotes all that is connoted or denoted by another, is true, if according to the signification which usage has attached to the names, this identity in their connotation or denotation really exists. The standard of truth, therefore, in respect to this class of propositions, is usage or convention.

A proposition which asserts that in whatever subjects one attribute or set of attributes are found, in those same or in a part of those same subjects, another attribute or set of attributes also exist; in other words, that one *phenomenon*, or state of our consciousness, is always or sometimes accompanied by another phenomenon or state of our consciousness; is true, if these two phenomena really are conjoined in the manner asserted. The standard of truth, therefore, in this class of propositions, is human consciousness or experience.]

Event, a change of an object, attribute, or feeling. See the chapter "Classification of things," *ad finem*. [Pp. 1003–4 *above*.]

[**The following paragraph, written on the opposite verso in the scribe's hand, is marked for insertion at this point. The placing of the following footnote is not exactly marked in this paragraph.*]

resemblances, or unlikenesses. As attributes are merely states of human feeling or consciousness, considered with reference to the objects which cause them, or to the minds which experience them; whenever two sensations or states of feeling are alike, the corresponding attributes may be said to be alike: and when unlike, unlike.*

Besides the class of the attributes of attributes, which we have now examined, namely, their relations; Attributes may also have qualities. The contemplation of an attribute may, like the contemplation of an object, excite certain feelings in the mind. But to excite in the mind a certain feeling, is that sort of attribute which we have termed a quality. We may, therefore, predicate of the abstract name which expresses an attribute, the concrete name which connotes a quality. Thus we may say with acknowledged propriety—Her beauty is delightful, just as we may say, Her person is delightful. In this case the predicate connotes a quality.[*] In the following proposition, His thoughtlessness is dangerous, the predicate connotes a relation; for *dangerous* means that which is a probable cause of evil or inconvenience to some sentient being.

In all these cases any one who has followed carefully the preceding part of this exposition, will easily perceive what is the matter of fact asserted.

[†]For the ordinary purposes of the elementary parts of Logic it is sufficient to say, that in these propositions, as in all others in which the predicate is a connotative term, the assertion is that the subject (which in this case is an attribute) possesses the attributes connoted by the predicate. If we wish to probe the matter deeper, we shall find that in these, as in the propositions, which we have previously examined, the import of the proposition always is, that some phenominon or state of consciousness, does or does not resemble, is or is not accompanied by, some other phenomonon or state of consciousness. The fact affirmed is therefore exactly the same kind of fact which we assert, when one concrete name is predicated of another. In many cases, it is not the same kind of fact only, but the very same fact. Thus, when we say that one sensible quality is like another, what is it but to say, that one sensation is like another? When we say of any attribute, that it is an attribute of some particular object, what is it but merely inverting the proposition that the object in question possesses that particular attribute? When we say of an attribute (as of thoughtlessness) that it is a cause of something (as of danger) what is [it] but to affirm, that the actions done by a thoughtless person (that is, states of his volition followed by visible outward phenomena) are causes of probable evil or inconvenience?

[‡]There are various modes in which a proposition, of which the subject is an abstract name, may be translated into a proposition composed of concrete names. There is one mode in particular, of very extensive application, by which a proposition relating to an attribute, is changed into a proposition relating to the objects possessing the attribute. The latter proposition is, in this case, of a peculiar form, which is best displayed by means of examples. Thus, *Courage is deserving of honor*, is a proposition equivalent to this "All courageous persons are deserving

*One attribute may be *greater* or *less*, than another attribute; as when we say, The whiteness of snow is greater than the whiteness of paper; The height of this house is double the height of the next.

[**The following example is used in* Chap. v, §7, ¶3.]

[†*From here to* the *before* import of the proposition *in the next sentence was added, in the scribe's hand, on the opposite verso, replacing a cancelled* The.]

[‡*This paragraph contributed to* Chap. v, §7, ¶3.]

of honour, *so far forth as they are courageous*," which is manifestly equivalent to this: "All persons who are courageous deserve an addition to the honor, or a diminution of the disgrace, which may attach to them from other causes." Again, *Virtue is beneficial to society*, is equivalent to "All virtuous persons are beneficial to society, so far forth as they are virtuous:" *i.e.* to this, All virtuous persons produce more beneficial effects to society, than persons similarly situated & similar in their other qualities, who are not virtuous.

There still remains for our consideration, the case in which both the subject and the predicate are abstract names. And we have now to enquire what is the nature of the matter of fact asserted in such a proposition.

It is here necessary to call to mind a distinction which we early made between two kinds of abstract names. We found that some were connotative and others not. There are names given to attributes which connote nothing, involve nothing in their signification except those attributes; there are other names given to attributes, which connote attributes of those attributes. Many of these last, indeed, are, as we have seen concrete names; for they connote an attribute which, though it may belong to an attribute, may also belong to a substance or a feeling. Such are all the connotative names which we used as predicates in our last set of examples. These *denote* either objects, or feelings, or attributes, as it may happen. But there are names which denote only attributes, & connote attributes of those attributes; or as we may express it, there are names, part of whose connotation is, that the thing they denote is an attribute, & nothing but an attribute. Thus there is on the one hand, the word *hurtful*, which denotes either objects or attributes, & connotes, what may be an attribute of either, namely, the production of evil or inconvenience; & on the other hand, we have the word *fault*, which connotes the very same thing, but denotes only attributes; & may be said without impropriety to connote, (in addition to the connotation already mentioned) that the thing it is predicated of, is an attribute. There might be an unlimited number of such words; there are a considerable number. In these cases the import of the proposition is clear. It is a proposition exactly similar to those which we last examined; the matter of fact affirmed is, that the attribute which is the subject of the proposition, possesses, or does not possess, the attribute which the predicate connotes; or (if we analize it further) that the phenomenon, or state of consciousness, which constitutes the former attribute is or is not accompanied by, does or does not resemble, some other phenomenon or state of consciousness.

Remains the case in which (the subject being still an abstract name) the predicate is one of those abstract names which are not connotative.

If an abstract name be not connotative, that is, do not involve in its signification any attribute of an attribute, & yet can be truly predicated of some other abstract name, that is, of some other name denoting an attribute; it must either be another name of the very same attribute, or it must be a name of a class of attributes, in which that particular one is included. The proposition "Cohesion is a tendency in objects to adhere together" is a specimen of the first kind. The subject & predicate are both names of the same attribute. The proposition "whiteness is a colour" is a specimen of the same class. Colour is the name of a class of attributes, and whiteness is the name of one of the attributes falling under that class.

As in names of objects, so in names of attributes, when the subject & predicate denote each the very same thing or things, neither more nor less, the proposition is either merely frivolous, or it expresses the meaning of a word. It either asserts that two words are synonymous, or it *defines* a word. We have already remarked,

that the definition of a connotative name consists in the enumeration of the attributes which it connotes. The definition of one of those abstract names, which are not connotative, is necessarily somewhat different: & is of two kinds.

If the attribute to be defined, be itself a union of several attributes; we have only to join together the names of those attributes taken separately, & we have the definition of the name which belongs to them all taken together. This definition of the attribute will correspond exactly to the definition of the concrete name connoting the attribute. For as we define a concrete name by enumerating the attributes which it connotes, & as the attributes connoted by a concrete name constitute the entire signification of the corresponding abstract one, the same enumeration will serve for the definition of both. Thus, if the definition of a *human being*, be thus "a being, corporeal, animated, rational & of such and such a form"; the definition of *humanity* will be, corporeity & animal life combined with rationality & with the same form.

When the abstract name does not express a complication of attributes but one single attribute, the phenomenon constituting that attribute may yet be of a complex nature, consisting of several parts either coexistent or in succession. We may then join together the names of the separate parts, & predicate them of the name of the whole. And this also will be a definition. Thus, eloquence might be defined, the power of influencing the affections of human beings by means of speech or writing.

In all these propositions the import is clear. They belong to the class of *essential* propositions; & the information which they communicate is simply the meaning of a term; with or without an implied assumption, that there exists an attribute corresponding to the definition, & by consequence objects possessing that attribute.

When the abstract name, which is the predicate of a proposition, is not convertible with the subject, it must be the name of a class of attributes, which includes the attribute denoted by the subject. The proposition therefore affirms that an attribute belongs to a certain class. But why does it belong to that class? why was it placed there? what does its belonging to that class import? In other words, why do we arrange attributes in classes, when the classification is not founded on any attribute of those attributes? The answer is clear. When we arrange attributes in classes, not according to the impression made on our minds by the contemplation of the attributes, nor according to the relation in which they stand to some other things; not, in short according to any attribute of those attributes; we can have but one other principle of classification, the *resemblance* of the sensations or other states of consciousness which constitute the attributes. Thus, paper-colour, milk-colour, snow-colour, & many others, are ranged in the class whiteness, on account of the resemblance of the sensations. To assert, therefore, that any of these attributes belongs to that class, is merely to assert, that the sensations resemble. To say, paper-colour is a whiteness, or is a white colour, is merely to say, The sensation we receive from the sight of paper, *resembles* to a certain degree, the sensations we receive from the sight of milk, of silver, of snow &c.

"Whiteness is a colour," is a proposition of the same class. If we conceive our sensations of colour to be classed together on account of their resemblance to each other, the proposition, Whiteness is a colour, will evidently express that resemblance only, & will therefore belong to the class we are now examining. Perhaps, however, in the very meaning of the word colour, is involved the notion

of being received. Still, however, it is the *sensation*, not the *attribute* which is received through the eye; what the word expresses is an attribute of the sensation; & this attribute of the sensation, is not an attribute of the attribute. *Colour*, therefore, is one of the abstract names which are not connotative; & the proposition Whiteness is a colour, merely asserts that the sensations we receive from the things we call white, resemble the sensations we receive from other coloured things: the resemblance being in this case partly a resemblance of relations, viz. both bearing an exactly similar relation to the object called the eye.

The same may be said of the propositions, Colour is a quality, & A quality is an attribute. Neither the word colour nor the word attribute are connotative. Denoting attributes, they do not imply an attribute of those attributes. Quality implies, not that the attribute (as *Colour*) but that the sensation, is received from the coloured object itself, without the aid of any other object. *Attribute* implies, not that the particular attributes denoted, but that the sensations, which constitute them, emanate from a subject. In predicating these names therefore, we are, as in the preceding instance, affirming a resemblance between sensations; & that resemblance is in these as in the preceding instance, a resemblance of relations.

But resemblance, as we have before remarked, between two simple feelings, means simply this, that when the two feelings are experienced together, or in immediate succession, a peculiar feeling, called the feeling of resemblance, succeeds. Resemblance between things more complex than simple feelings, means that into those complex wholes, particular parts enter, which resemble each other; that is, which excite the feeling of resemblance, perhaps of exact similarity. All propositions, therefore, which assert resemblance, merely assert, that certain human feelings are followed by certain others.

We have now examined all the possible cases of Predication. What may be deficient or obscure in our analysis of them, will be rendered more intelligible by the sequel of this work. We have, however, unless I am mistaken, established clearly, what, in all propositions whatever, is the assertion made; the matter of fact which is the object of belief.

Propositions, we have found, do not, agreeably to the doctrine of Hobbes, assert in all cases whatever, only one kind of fact, namely an agreement between the significations of two names. Propositions may, on the contrary, be divided into two species; of which one only answers to Hobbes's definition:

1st. Propositions containing assertions respecting the meaning of names: these are, propositions of which the predicate is a proper name; definitions, & other *essential, or in other words identical, propositions:*

and 2dly. Propositions which either affirm or deny a fact, of the following description: That two phenomina, cognizable by the external senses or by internal consciousness, occur in conjunction; *i.e.* that when a certain phenominon takes place, a certain other phenominon takes place likewise; either simultaneously or in succession; with or without an interval of time.

If it be now asked, what constitutes a *true* proposition; we can give no other answer, than the apparently superficial one with which we commenced. The proposition is true, if the assertion contained in it, be conformable to the fact; or in other words, if there exist any real fact, of which the assertion contained in the proposition, is an exact representation.

Having now, however, analysed the assertion contained in every proposition, and found that the fact asserted is either the identity of the meaning of two names, or the coexistence of the phenomina; we may, in consequence, add to the

general definition of a true proposition, a more particular description of what constitutes the truth of each of the two species into which propositions have just been divided.

[*]A proposition, then, which asserts that one name denotes or connotes all that is denoted or connoted by another, is true, if, according to the signification which usage or express appointment has attached to the two names, this identity in their connotation or denotation really exists. The standard of truth, therefore, in respect to this class of propositions, is usage or convention.

A proposition which asserts that in whatever subjects one attribute or set of attributes are found, in those same, or in a part of those same subjects another attribute or set of attributes also exist:

Or that a particular attribute or set of attributes exist in a given subject, individually designated;

Or that two objects or attributes resemble, either in themselves or in their relations;

All these propositions affirm in other words, that one *phenominon* or state of our consciousness, is always or sometimes *accompanied* (simultaneously or successively) by another phenominon or state of consciousness. The proposition, therefore, is true, if these two phenomina really are conjoined in the manner asserted & false if they are not. And the standard of truth, in respect to this class of propositions is human consciousness or experience.

[**This discussion contributed to* Chap. vi, §1, ¶2.]

OF THE PREDICABLES OR UNIVERSALS

[Chapter vii: Of the Nature of Classification, and the Five Predicables]

[§2]

[¶1] Having considered the nature of Predication in general, & its various sorts, we may, not without advantage, touch upon the doctrine of the Predicables; a set of distinctions handed down to us by Aristotle and his follower Porphyry, & some of which are well worthy of a place in modern philosophy, in which indeed several of them have taken firm root.

The Predicables are a classification of general names, arising out of Predication; and founded, not (like the numerous divisions & distinctions among general names of which we have hitherto treated) upon diversities in the meanings & functions of the words themselves, but upon diversities in the relation which they bear to some particular *subject* of which they happen to be predicated. Logicians reckon five different Predicables. We may predicate of the name of any thing, five different kinds of general names.

A *genus* of the thing	(γένος)
A *species*	(εἶδὸς)
A *differentia*	(διαφορὰ)
A *proprium*	(ἴδιόν)
An *accidens*	(συμβεβηκος)

[¶2] But, as we have already intimated, general names are not parcelled out among these five classes, in such a manner that each inherently & for ever belongs to only one of the classes. The same name is in one class or another, according to the *subject* of which we conceive it to be, on the particular occasion, predicated. *Animal* is a *genus* with respect to *man*, or John; a *species* with respect to *substance*, or creature. *Rectangular* is one of the *differentiæ* of a *geometrical square*; it is merely one of the *accidentia* of the table on which I am writing.

We proceed briefly to characterize, & distinguish from one another, the five Predicables; in other words, the five different relations in which a general name, predicated of a given subject, may stand to that subject.

[§3]

[¶1] *Genus, species, & differentia*, are used in two different acceptations; their *popular* acceptation, in so far as such a term is applicable to any of the technical expressions of Logic; & the narrower sense in which they are used by the Aristotelian Logicians.

In their more popular acceptation, the mutual relations of these three terms are easily stated. As the power of framing classes is unlimited, we may frame two, one of which shall include the whole of the other and more. Such, for instance, are *animal* and *man*: *man & mathematician*. The larger of the two classes, which includes the smaller, is called the Genus. The smaller of the two, which is included in the larger, is called the Species. The distinction holds, whether the classes be classes of substances, of feelings, or of attributes. *Animal*, for instance, is a Genus; *man & brute*, its two *Species*; or we may divide it into a greater number of species, as man, horse, dog, &c. *Biped* or *two-footed animal* may also be considered a *genus* of which *man & bird* are two *species*. Taste is a genus, of

which, *sweet taste, sour taste, salt taste,* &c. are species. Virtue is a *genus*; *justice, generosity, courage, fortitude, prudence* &c. are its species.

[¶2] The same class, which is a *genus* with reference to the subclasses or species included in it, may be itself a species with reference to a superior genus. Thus, *man* is a species with reference to *animal*, but a genus with reference to the species *mathematician. Animal* is a *genus* divided into two species, *man & brute*; but *animal*, also, is a species, which with another species *vegetable*, makes up the *genus* "Organized Being." Biped is a genus with reference to *man & bird*, but a *species* with reference to the superior genus *animal*. Taste is a genus divided into species, but it is also a species under the genus Sensation. Virtue, a genus with reference to justice, temperance &c. is one of the species of the genus Mental Quality.

[¶3] In this popular sense the words Genus & Species have passed into common discourse. The word *Differentia*, or Specific Difference, is hardly used except by professed metaphysicians; by them, however, it is generally employed in a sense sufficiently extended, to correspond with the popular extension of the words Genus & Species. In this sense, the Differentia of a Species is any attribute, common to every individual of that species, & serving to distinguish it from all other species of the same genus. Thus, rationality may be considered the Differentia of the species *man*, with reference to the genus *animal*; being an attribute possessed by all the individuals of that species, & by them alone among all the individuals belonging to the genus; serving, therefore, to distinguish the species *man* from the coordinate species, *brute*. If instead of referring *man* to the genus *animal*, we placed him under the genus *biped*, his *differentia* according to the old jest, would be *featherless*; or *featherlessness*, for in this loose employment of language,[*] it is not material whether the concrete, or the abstract name be employed.

[¶4] By the Aristotelian logicians, the terms are used in a more confined sense. *Animal* would by them be considered a *genus & man & brute*, coordinate species under that genus; but *biped* would not be admitted to be a genus, with reference to *man*, nor *featherless* one of the *differentiæ* of that species. It was necessary, according to their theory, that *genus, species & differentia*, should be of the *essence* of the subject. Whatever was not of its essence, belonged not to these three predicables, but to *proprium & accidens. Biped* was not of the essence of man, & therefore did not stand in the relation of *genus* to that species, but of *proprium* or *accidens* only.

[¶5] In the previous chapter, we entered at large into the distinction between essential & accidental predication, & between essential and accidental attributes or properties. We found that this distinction, which has been the occasion of so much abstruse speculation, & to which so mysterious a character was formerly, & by many writers is still, attached, amounts to nothing but the difference between those attributes of a class which are involved in the signification of the name of the class, & those attributes which are not so involved. We found that there are no essences of individuals; that, as applied to individuals, the word essence has no meaning, except as connected with the exploded tenets of the Realists: but that when we predicate of the name of a class, the name which connotes any one or more of the attributes constitutive of the class, we produce an Essential Predication.

[***The preceding nine words were added in JSM's hand on the opposite verso, marked for insertion here.*]

[§*4**] The schoolmen, however, did not recognize this doctrine. The class to which any individual was most familiarly referred, (as John, Peter, &c to the class *man*) they considered as properly & inherently the species to which that individual belonged. Any further subdivisions into which that same class might be capable of being broken down (as *man* into black, white, & red man, or into priest & layman) they did not admit to be species. Having thus made over every individual in the universe to the indefeasible paramountcy of some one particular species, they next held that whatever was of the essence of the species, (by which they meant, though they knew it not, whatever was involved in the signification of its name) was of the essence of the individual also. Animality, therefore, & rationality, being of the essence of the species *man* (i.e. connoted by the name) were, according to them, of the essence likewise of John & William: but bipedity having nothing to do with the essence of *man* (for the word *man* involves not that quality in its signification) is not of the essence of John either; & consequently *two-footed* is neither a genus of John nor one of his Differentiæ; but is merely predicable of him accidentally, & belongs not to one of the first three, but to one of the two latter, Predicables.

The Aristotelians being the original authors of these important terms & distinctions, it is reasonable that before we attach a meaning of our own to them, we should ascertain how far that which was given to them by their inventors is capable of being reconciled to the true theory of the subject. Dropping therefore, the essences of individuals, a figment of which nothing rational can be made, but adhering to the assumption that the Genus & the Differentia must be of the essence of the Species, let us enquire what mutual relations of the three terms are consequent upon that supposition. And first, when the classes in question are classes of substances or of feelings, & the names, consequently, connotative.

[§5]

[¶4] From the very fact that the Genus includes the Species, in other words, *denotes* more than the Species, or is predicable of a greater number of individuals, it follows that the Species must *connote* more than the Genus. It must connote all the attributes which the Genus connotes; otherwise there would be nothing to hinder it from denoting individuals not included in the Genus. And it must connote something besides, otherwise it would include the whole Genus. *Man* denotes all the individuals denoted by *mathematician* & many more: *Mathematician*, consequently, must connote all that *man* connotes, otherwise there might be mathematicians who were not men; & it must connote something more than *man* connotes; otherwise all men would be mathematicians. The Species, therefore, connotes all that the Genus connotes, & something more.

Take from the Species all that it connotes more than the Genus, & let there be another word which connotes this surplus taken by itself; that word is the Differentia, or Specific Difference. Or it may be stated thus: The Differentia is the word which connotes what must be added to the connotation of the Genus, to make up the connotation of the Species. [¶5] The Differentia is said properly enough to *constitute* the Species. The Differentia of the class *mathematician* considered as a species of the genus *man*, is, "knowing mathematics;" for that

[**The next two paragraphs were radically altered and expanded as a result of JSM's development of the doctrine of Natural Kinds. See Textual Introduction,* p. lxv, *and cf.* 1033n.]

is the word which connotes what *mathematician* connotes more than *man*. The differentia of the class *man*, considered as a species of the genus *animal*, is two-fold, "rational & of a certain [*]particular form" (the form which we all know). Both these attributes are connoted by *man*, exclusively of what it connotes in common with *animal*: & there is no *single* word which connotes these attributes without connoting any others. The compound word, *rational & of the human form* is therefore the Differentia or Specific Difference of the species man, considered as referred to the genus Animal. This same Differentia, which is said to be the Specific Difference of *man*, is called a Generic Differentia with reference to any sub-class, with regard to which *man* is itself a Genus. With regard to *man*, it is the Specific Difference, or the Difference which constitutes the Species itself: with regard to *mathematician*, it is the Difference which constitutes a prior class, a class which, with reference to *mathematician* is but a Genus, not the Species.

[†]Thus we have a very clear view of the relation between Genus, Species, & Differentia, when the things classified are either Substances, or Feelings. But how when they are neither Feelings nor Substances, but Attributes? for these also are classified; are formed into classes & subclasses, which are not only popularly called Genera & Species, but are reckoned such by the schoolmen themselves. Thus, *quality* is a *genus*, of which *colour* is one of the species; *colour* is a genus, whiteness one of its species. These genera, equally with any of the others, are said by the Aristotelians to be of the essence of their species. "Colour is a quality" they would call an Essential Predication; "whiteness is a colour" the like. In what sense? for the terms, as we have formerly shown, not being connotative, the explanation which we have already given of essences & essential predication, will not serve.

I apprehend that the word *essence*, in this case, has no meaning; no more than in the case of the pretended essences of individuals. In the case of connotative names, we found that *essence, & essential predication* had a meaning; though one which the inventors of those phrases did not see to the bottom of. They said, that is of the essence of any thing, without which it could neither be, nor be conceived to be; now that without which a man could not be nor be conceived to be, is that, in the absence of which we should not call him man; that is, the attributes which the name *man* connotes. Such attributes, therefore, are really of the essence of man, in the scholastic sense; & the propositions in which words which connote any of those attributes, are predicated of man, form a class apart, distinguished from other predications by the fact that they communicate no information to any one who previously knew the meaning of the word which is the subject of the proposition. Now, if, taking for the subject of our proposition an abstract name which is not connotative, we can frame any predications which shall possess this same property of affirming nothing but what is already implied in the meaning of that abstract non-connotative name, we may with great propriety call these predications, essential ones. But in our last chapter we found but one such predication; the definition of the abstract name, & not even that always; as we shall see hereafter. The proposition "Whiteness is a colour," tried by this criterion, certainly is not an essential proposition. The idea of colour is certainly not implied in the meaning of the word whiteness. Any one knows the meaning of the word whiteness, who knows the sensation of white. But when we

[**Gathering* H *begins here.*]

[†*The next six paragraphs disappeared in the rewriting of* §§4 *and* 5; *cf.* p. 1032n.]

place whiteness in the class *colour*, we imply much more than the sensation of white; we place it there on account of a distant resemblance to the numerous other sensations which we call colours; or else, on account of a wholly extrinsic circumstance, that of being perceived through the eye. Colour, therefore, is not of the essence of whiteness, in the sense in which animality & rationality are of the essence of man, viz. as being implied in the meaning of the name. But we found that this was the only rational sense, in which the term essence could be understood. In no rational sense, therefore, is colour of the essence of whiteness,[*] and the doctrine, that the genus must be of the essence of the species, will not, in this case, hold.

What then, did the Aristotelians mean, or what reason had they for maintaining that in the case of attributes as well as of substances, the genus must be of the essence of the species? Merely this: that the genus is, as they expressed it, predicated *in quid*: that is, in answer to the question, *What* the thing is. Thus if you ask, what is John? the first answer is, A man; if you ask, what is a man? the answer is, An animal, or A rational animal: If, What is whiteness? the answer is, A colour. But the reason of this is very simple. When we are asked, What a thing is? we naturally answer by naming the class to which the thing is most familiarly referred. If we are pressed still harder, then, besides naming the class to which the thing is most familiarly referred, we mention the circumstance which distinguishes it from the other things belonging to the class. This explains why the Genus & Differentia were held to be of the essence of the subject. But if this explanation be correct, then the distinction set up by the schoolmen between the Genus to which anything belonged, & any other class which could be formed including that thing was a mere difference of custom & convenience: & (as we have already seen in the case of what they called their lowest Species, which they did not allow to be divisible into other species) all they did was, to take the classification which had become most habitual, & ascribe to it a prerogative of supremacy, imposing on every individual an indefeasible allegiance to a particular series of classes (rising one above another like the middleman & the head landlord of an Irish estate) because the custom which had associated it with those particular groups was so strong that it was mistaken (as custom so often is) for a law of nature.

The definition which I shall endeavour to give of Genus & Differentia, will retain as much of the spirit of the Aristotelian employment of the terms as is compatible with the rejection of this notion of *jure divino* classifications. Those terms on the one hand, & *proprium* & *accidens* on the other, may, I conceive, with little variation from their original meaning, be employed to mark distinctions which really exist, & are well worth preserving, and dwelling upon.

In all classifications, that is, in all parcelling out of a mixed multitude of objects into classes & subclasses, we may distinguish one *main* division & a number of *cross* divisions. We may make as many divisions as we can conceive attributes; we in fact, do so whenever we give a name which connotes any attribute; for by the fact of giving the name, we establish a division of things in general, into those which possess the given attribute & those which do not. But notwithstanding this, there is in all cases some one particular system of divisions and subdivisions,

[**The remainder of this sentence, and the next paragraph to* because *in the final sentence, were added by JSM on the opposite verso to replace the cancelled* & the doctrine, that]

which forms as it were the ground-work of all other divisions which are made of the same complex whole. There is some one particular way of grouping the objects, to which the general course of our ideas seems to adapt itself, & upon which all other arrangements of the same objects are as it were engrafted. Thus, for instance the division of substances into organized & inorganic; that of organized substances, into animal & vegetable; of animals into man, beasts, birds, fishes, insects, reptiles, &c. constitute a system of divisions, (or, as we commonly say, a classification) founded upon the most obvious resemblances & upon the most obvious differences, of the things which are thus classed: an arrangement, in which those which are manifestly & at the first view alike, are placed together; those which are manifestly & at the first view unlike, are placed separate: an arrangement, therefore, into which the mind so naturally falls (that is, falls so readily, & as it were of itself) that the schoolmen may be excused for having thought that this classification, was the work of nature, while all other arrangements of the same objects were arbitrary, & the work of men.

This, therefore, is an example of a *main* division; we shall come to the *cross* divisions presently. All the classes, which are constituted by a *main* division, are genera & species: each class being a genus with reference to its own subdivisions, & a species with regard to those superior classes of which it is itself a subdivision.

[§6]

[¶1] Besides the main divisions, which are such because they accord with the arrangement & grouping into which our ideas naturally fall without any express intention, we may also artificially make other main divisions, for reasons of special convenience. For example, a naturalist considers the various kinds of animals, & looks out for the classification of them which may most accord with the order in which, for the purposes of his science, it is desirable that his ideas should present themselves; with this view he finds it advisable that one of his fundamental divisions should be that into warm-blooded & cold-blooded animals; or into the animals which breathe with lungs, & those which breathe with gills; or into carnivorous, & frugivorous or graminivorous; or into those which walk on the flat part and those which walk on the extremity of the foot, a distinction on which some of Cuvier's families are founded. These classes, not being those to which the individual animal is familiarly & spontaneously referred, or in which we should ever think of arranging the animal kingdom unless for a preconcerted purpose, or in pursuance of a previous convention; the schoolmen would not have allowed to them the character of genera or species. For, the schoolmen would allow no classification, as the fundamental one, except that which being most familiar they deemed to be the work of nature. But we, who know that classification is arbitrary, and exists for the sake of human convenience, must allow that the groups into which objects first class themselves, according to their obvious & superficial resemblances, may not be the most convenient ones for the purposes of a particular art or science. For that special purpose, the objects, which are most conveniently placed together, are those which agree in the properties which that art or science takes special cognizance of. And even for the general purposes of human knowledge, when pursued *scientifically*, objects should be classed not according to the resemblances & differences which are the most obvious, but according to those which are either in themselves the most interesting, or are an indication of others which are so. These considerations

often suggest the expediency of adopting, as fundamental divisions, on which to ground an author's main classification, distinctions very remote from the obvious ones which the mind forms as it were spontaneously. But the classes which are the result of these divisions, are as much entitled to be considered genera & species, as any other classes, so soon as the speaker or writer has adopted them into his main division.

[*]But let us now take any attribute of objects, which has not been adopted as the *basis* of their classification; for instance, (in speaking of plants, or animals) their colour. On this attribute is actually founded as real a *classification* of plants or animals as on any other attribute which we have named.

The word *white*, of itself divides all objects, & plants or animals among the rest, into two classes; white objects, & objects which are *not* white. If we were to enumerate all the names which connote colours, they would provide us with a general arrangement & classification of all substances. We have white substances, black substances, red substances &c.: We have even classes & subclasses: red substances, for instance, are either scarlet, crimson, or of various other shades & varieties of red colour. Why are these classes not genera & species? Merely because nobody has ever thought of making the division of objects according to their colour, his main & fundamental classification of them, & presenting all other divisions as engrafted upon & growing out of that. It was open to any person to do so; this, like any other division, might have been made the fundamental division, if anyone had chosen. But nobody's purposes were answered by it. The colours of objects are neither in themselves the most interesting, or important of their attributes; nor do they *point* to any considerable number of attributes besides themselves. Plants & animals which agree in colour, differ in almost every other attribute; & others, again differ in colour, which agree in almost every thing else. There would have been no convenience, therefore, in making the division of objects according to colours the main division; it accordingly continues in the state of a *cross* division; objects are grouped according to quite other attributes, & the divisions constituted by colour are as it were lines drawn across the other classification & cutting off a segment from each of the groups, founded on some other attribute; from the group *flowers* the segment *white* flowers; from the group *animals* the segment *white animals*, & so on. These segments are classes, but are not genera & species. They belong to the predicables *proprium* & *accidens*.

[†]Having now settled, with as much precision as the case seems to admit, the notions of Genus & Species, we shall easily frame a correspondent notion of Differentia. Every Differentia is called such, in relation to a particular Genus & to a particular Species; & is the name (whether abstract or concrete) signifying the attribute which *constitutes* the Species; in other words, the attribute which we had in view when we cut that Species out of the Genus; & which we intended to constitute the distinction between that Species & all other Species of the same Genus.

[¶2] Now if we cut a species out of a genus, the species *man*, for instance, out of the genus *animal* with the intention on our part that the distinction between *man* & all other species of animal should be *rationality*, then rationality is involved in the signification of the word *man*; in other words connoted by it; for it is obvious that what we have expressly in view when we impose a name, forms

[**The next two paragraphs disappeared in the rewriting.*]
[†*This paragraph contributed to* §5, ¶4.]

part of the meaning of that name. If again, being naturalists, we for the purpose of our particular study, cut out of the genus *animal* the same species *man*, but with an intention on our part that the distinction between *man* & all other species of animal should be, not rationality, but the possession of thirty two teeth, so many cutting teeth & so many grinders; it is evident that the name *man*, when used by us as naturalists, no longer connotes rationality, but connotes the possession of thirty two teeth. We may therefore, lay it down as a maxim, that where-ever there is a Genus, & a Species marked out from that Genus, by an assignable Differentia, the name of the Species must be connotative, & must connote the Differentia; but it may be a *special* connotation, not involved in the signification of the term as ordinarily used, but given to it when employed as a term of art or science. The word *man*, in common use, connotes rationality & a certain form, but does not connote the number of teeth; in the Linnean system it connotes the number of teeth, but does not connote rationality or any particular form. The word *man*, therefore has two different meanings; but it is not commonly considered ambiguous, because it happens in both senses, to *denote* the same individuals. But we may easily conceive a case in which the ambiguity would be obvious; we have only to imagine that some new species of animal were discovered, possessing thirty two teeth, but not rational nor of the human form. In ordinary parlance these animals would not be called men; but in natural history, they must be called so, *if the Linnean classification were adhered to*; which, however, in all probability it would not be.

[¶3] Words not otherwise connotative may in this manner acquire a *special* or *technical* connotation. Thus, the word *whiteness*, as we have so often remarked, connotes nothing; it merely denotes the attribute corresponding to a certain sensation; but if we are making a classification of colours, & desire to mark out, or to justify, the particular place which we have assigned to whiteness in an arrangement, we may define it, "the colour produced by the mixture of all the simple rays;" & this fact, though by no means implied in the meaning of the word whiteness as ordinarily used, becomes part of its meaning in the particular essay or treatise, & becomes the Differentia of the Species.

[¶4] The *Differentia*, therefore, of any Species, may be defined to be, that part of its connotation (whether *ordinary*, or *special* & *technical*) which distinguishes it from all other Species of the Genus to which on the particular occasion we are referring it.

[§7]

[¶1] Having now disposed of Genus, Species, and Differentia we shall find no difficulty in attaining a clear conception of the distinction between the other two Predicables.

[¶2] According to the schoolmen, Genus & Differentia are of the *essence* of the subject, (that is, form part of the ordinary connotation of the name of the Species): *Proprium* & *Accidens* on the other hand form no part of the Essence, but are predicated of the Species *accidentally*. Of these two, *Proprium*, they continue, is predicated *accidentally*, indeed, but *necessarily*; that is, signifies an attribute which is not, indeed, *part* of the essence, but flows from, or is a consequence of, the essence, & therefore is inseparably attached to the Species: as the properties of a triangle, though no part of its definition, yet must necessarily be possessed by whatever comes under the definition. Accidens, on the contrary, has

no connection at all with the essence; & whether separable or inseparable from the Species in *reality*, its removal would not alter our *conception* of the Species.

[*]As we have found it necessary to include under the head of Genus & Differentia, much which is not of the essence of the species, that is, which forms no part of its ordinary connotation, we must alter the other definitions accordingly. We shall then define the five Predicables as follows:

Species is any class.

Genus is any class which stands above & includes, that class, in our *main* or *fundamental* classification: whether that be the classification most familiarly used in ordinary life, or one made for the specific purpose of some Art or Science.

By placing a Species under a Genus, it acquires a special Connotation, even if it had not already an ordinary one. *Differentia* is that attribute, or (if there be several) any one of those attributes, which, being either ordinarily or specially connoted by the name of the Species, serve to distinguish it from the other species of the same Genus.

[¶3] A *Proprium* of the Species, is any attribute belonging to all the individuals included in it; not, however, connoted by its name, either ordinarily (if the classification be for ordinary purposes) or specially (if it be for a special purpose) but *following* from some attribute which is either ordinarily, or (as it may happen) specially, connoted by it.

[¶4] One attribute may follow from another in two ways, & there are consequently two kinds of Proprium. It may follow as a conclusion follows premisses, or it may follow as an effect follows a cause. Thus, the attribute of having the opposite sides equal, (which is not one of those connoted by the word *parallelogram*) nevertheless *follows* from those connoted by it, viz. from those of having the opposite sides *straight lines* & *parallel*. The attribute of having the opposite sides equal, is therefore, a *Proprium* of the species Parallelogram; & a Proprium of the *first* kind, which follows from the connoted attributes by way of *demonstration*. The attribute of being capable of understanding language is also a Proprium of the species *man*, since, while not connoted by the word, it *follows* from an attribute which the word does connote, viz. from the attribute of rationality. But this is a Proprium of the *second* kind, which follows by way of *causation*. Whether a Proprium follows by demonstration or causation, it follows *necessarily*; that is to say, it *cannot but* follow, consistently with the known laws of the universe.

[§8]

[¶1] Remains the fifth Predicable, *Accidens*. Under this name are comprehended all the attributes which are neither involved in the signification of the name, (whether ordinarily or as a term of art) nor have, as far as we know, any necessary connexion with attributes which are so involved. They are commonly divided into Separable & Inseparable Accidents. Inseparable Accidents are such as are universal, but not necessary. Thus blackness is an attribute of a crow: & as far as we know, a universal one. But, if we were to discover a race of brown birds, in other respects resembling crows, we should call them crows; crow, therefore does not *connote* blackness; nor, from any of the attributes which it *does* connote, whether as a word in vulgar use or as a term of art, could black-

[**The next four paragraphs disappeared in the rewriting.*]

ness be inferred. Not only, therefore, can we conceive a brown or red crow, but we know of no reason why such an animal should not exist.

[¶2] Separable Accidents are such as do not belong to every individual of the species, but only to some; or if to all not at all times. Thus, the *colour* of a European is one of the separable *accidents* of the species man, because it is not an attribute of all human beings: *Being born* is also a separable accident of the species man, because though it is an attribute of all human beings, it is so only at one particular time.

OF DEFINITION

[Chapter viii: Of Definition]

[§1]

[¶1] The object & nature of Definition will not require much elucidation, as the greater part of what is necessary to make them apparent, has been already stated, incidentally to other topics.

[¶2] The simplest and most correct idea of a Definition, is a proposition which declares the meaning of a word: namely, either the meaning it bears in common acceptation, or that which the speaker or writer, for the particular purposes of his discourse, intends to annex to it.

[¶3] The Definition of a word being the proposition which enunciates its meaning, it follows that words which have no meaning, are unsusceptible of definition. Proper names, therefore, cannot be defined. A proper name being a mere unmeaning mark put upon an individual, we cannot declare its meaning; though we may indicate by language, as we might indicate still more conveniently by pointing with the finger, what is the individual upon which that particular mark has been or is intended to be put. It is no definition of "John Thomson" to say, he is "the son of General Thomson," for the name "*John Thomson*" does not express this. It is no definition of "John Thomson" to say he is "the man who is now crossing the street." These propositions may serve to make known who is the particular man to whom the name belongs, but that may be done still more unambiguously by pointing to him, which however has never been esteemed one of the modes of Definition.

[¶4] In the case of Connotative names, the meaning, as we have so often observed, is the connotation: & the definition of a connotative name, is a proposition which declares its connotation. Now this may be done either directly or indirectly. The direct way would be by a proposition in this form: "Man" (or whatever the word may be) "is a name connoting such & such attributes" or "is a name which signifies the possession of such & such attributes, by all the things whereof it is predicated." This would be the most precise form. The definition of Man, in this form, would be, man is a name connoting corporeity, organization, life, rationality & a certain well known external form.

[¶5] This, however, is not sufficiently brief, & is moreover too technical & apparently pedantic for common discourse. The more usual mode of declaring the connotation of a name, is to predicate of it another name or names, of known signification, which connote the same aggregation of attributes. This is done either by predicating, of the name intended to be defined, another connotative name, exactly synonymous; as, "Man is a human being;" this is not commonly reckoned a definition at all; or a plurality of connotative names, which among them, make up the whole of the connotation of the name which is to be defined. In this last case, again, we may either take the several attributes singly, & join together the whole of the names which connote those attributes separately; as, Man is a corporeal, organized, animated, rational being, of a certain form; or we may employ names which connote several of the attributes at once; as, Man is a rational *animal* of a certain form.

[¶6] The definition of a name, therefore, according to the notion of it which we have been endeavouring to inculcate, is the sum total of all the *essential*

propositions which can be formed concerning the name. All the propositions, the truth of which is self-evident; all those which we are made aware of by merely hearing the name, are included in the Definition if complete, and are included indirectly & expressly, not by way of inference; whether the definition comprehends them in a few words, or in a larger number.

When Condillac & other writers have said that a definition is an *analysis*, what they have really meant seems to be merely what we have now stated. To resolve any complete whole into the elements of which it is compounded, may properly be called an operation of analysis: & this we in some measure do, when we replace *one* word which connotes a whole set of attributes by two or more words, which connote the same set of attributes singly, or in smaller groups.

[§2]

[¶1] From this however the question naturally arises, in what manner we are to define a name which connotes only a single attribute? for instance, the name *white* which connotes nothing but whiteness, *rational*, which connotes nothing but the possession of reason. It would seem that such names could only be defined in two ways; by a synonymous term, if any can be found; or in the direct way already alluded to, "White is a name connoting the attribute of whiteness." Let us see, however, whether the *analysis* of the meaning of the name, that is, the breaking down of that meaning into separate parts, admits of being carried farther. In the case of the word *white*, it would seem not; but in the case of *rational*, it is obvious that some further explanation may be given of the meaning of that term, than is contained in the proposition "Rational is a name connoting the possession of reason," since the attribute, reason, itself admits of being defined. And here we are obliged to turn our attention to the definitions of attributes, or rather of the names of attributes, that is, of abstract names, having hitherto confined ourselves to the first two classes of names, proper & connotative.

[¶2] What the definition of the name of an attribute consists in, has been very clearly shown in the preceeding chapter. Some names of attributes are connotative. These, like other connotative names, must be defined by declaring their connotation. In other cases, we found that the attribute denoted by the abstract name, is itself a union of several attributes; in this case the analysis must be carried on, by enumerating those attributes; as when we defined *humanity* to be, corporeity & animal life combined with rationality & a certain form. [¶3] We found still another class of cases, in which though the attribute denoted by the abstract name, is not a complication of *attributes*, still the phenominon constituting that attribute, is a complication of *phenomina*. We must then carry on the analysis, by defining those more simple and elementary phenomina. Under this class comes our former example, rationality, which in whatever way we may resolve to define it, expresses a series of very complicated phenomina. We have already employed an apter example, the word *eloquence*, which we defined "the power of influencing the affections of human beings by means of speech or writing."

[¶4] Thus, then, we define a name, whether concrete or abstract, whenever we are able to analyse, that is, to distinguish into parts, the attribute or set of attributes, which constitute their meaning: if a set of attributes, by enumerating them; if a single attribute, by dissecting & exhibiting in its separate elements, the fact or phenominon, that is the cluster or series of human feelings, or states of

consciousness, which constitute that attribute, or rather which when considered as excited or as experienced by any *object, are* that attribute. Even when the fact which constitutes the attribute, is unsusceptible of analysis, that is to say, is a simple sensation or other simple feeling, the name of the object & the name of the attribute, still admit of definition. Whiteness, we may say, is *the property of giving the sensation of white*; a *white object* is *an object which gives the sensation of white*. The only names which are wholly unsusceptible of definition are the names of the simple feelings themselves. These are in the same predicament as proper names. They are not indeed, like those names, unmeaning; for the words *sensation of white* signify that the individual sensation which we call by that name, resembles the sensations formerly experienced by us, to which the same name was given: but as we have no words by which [*]to recall those former sensations, except the very word which we want to define, or some other exactly synonymous with it, words cannot unfold the signification of this class of names; and we are obliged to make a direct appeal to the party's own ocular experience.

[§3]

[¶1] Having stated what we conceive to be the philosophical idea of a Definition, we proceed to examine some popular conceptions of it, which conflict more or less with the above.

[¶2] The only Definition of a name, which will satisfy a philosopher, is one which declares the facts, and the whole of the facts, which are involved in the signification of the name. But in most cases, & with most persons, the object of a definition does not embrace so much. They look for nothing more in a Definition, than a guide to the proper use of the term; a protection to them against applying it in a manner inconsistent with custom & convention. Anything, therefore, is to them a sufficient definition of a term, which will serve as a correct index to what it *denotes*; although not embracing the whole, & sometimes perhaps not even a part, of what it connotes. This gives rise to two kinds of imperfect or unscientific definitions; namely, Essential but incomplete Definitions, & Accidental Definitions, or Descriptions. In the former, a connotative name is defined by a part only of its connotation; in the latter, by something which forms no part of its connotation at all.

[¶3] An example of the first kind of imperfect definitions, is the following: Man is a rational animal. It is impossible to consider this as a complete definition of the word *man*, since if we adhered to it we should be obliged to call the Houyhnhms men: but as there happen to be no Houyhnhms, this imperfect definition is sufficient to mark out, & distinguish from all other things, the objects at present *denoted* by man; all the beings actually in existence, of whom the word is predicable. Though the word is defined by an enumeration of some only among the attributes which it connotes, not of all, yet it so happens that all things which possess the attributes enumerated, possess also those which are omitted, so that the field of *de*notation which the word covers, & that employment of it in predication, which is conformable to usage, are quite as well indicated by the incomplete definition, as by a complete one. Such a definition, however, is always liable to be overset by the discovery of new objects in nature.

[¶4] Definitions of this kind are what philosophers have had in view when they

[**Gathering* I *begins here.*]

laid it down as a rule that the definition of a species should be *per genus et differentiam*. A complete definition according to the philosophical idea of it should be *per genus et differentias* rather than *differentiam*: it should include, with the name of the superior genus, not merely *some* attribute which distinguishes the species intended to be defined, from all other species of the same genus, but *all* the attributes implied in the name of the species, which the name of the superior genus does not by connotation include.

The assertion, however, that a definition must of necessity consist of a *genus* & *differentiæ* at all, is not tenable: for, as was early remarked, the *summum genus* in any classification, having no superior genus, cannot be defined in this manner: yet we have seen that all names, (even *summa genera*) except the names of simple sensations or other elementary feelings, may be defined, and in the very strictest sense, by setting forth in words the sensations or other facts of consciousness, of which the connotation of all words is ultimately composed.

[*]The notion that a Definition should consist of the superior Genus & some one specific Difference, a notion which we first find distinctly enunciated by Aristotle & his followers, seems to have arisen from a peculiar connection which existed in the minds of those philosophers between the idea of Definition and that of Division or Classification; & is closely allied to the erroneous notion which they entertained of the latter process. In laying down a Definition, they did not consider themselves as setting forth the meaning of a name, but as declaring a classification; drawing as it were a line round a particular class, to point out its limits, designate the objects which fall under it, & indicate its place in the network of genera & species, which they had spread over all nature. In my view of classification, the connection between that operation and nomenclature is as close as it was deemed to be by Aristotle; but I regard names as being oftener the instruments, the sources, or the occasions of classification, than its results: whenever we give a name to any thing, intending by that name to express any of its properties, we by that very fact accomplish a classification; we divide all things into two kinds, those which possess the properties in question, & those which do not. Classification therefore, is in general not the cause but the result of nomenclature; by every significant name which it suits our convenience to construct we create a new classification. The ancients however viewed classification in a totally different light. They thought that Nature herself had marked things out into classes; & they consequently regarded general names, & the Definitions which declared the import of those names, not as operations from which there *resulted* classifications of man's making, but as the exponents of a classification already made. It naturally, therefore, appeared to them, that a definition had attained its purpose, if it was such as would enable them to discriminate, & segregate from all others, the individuals composing the class thus framed by the hand of nature.

[§4]

[¶1] These considerations explain why the ancients, and philosophers in general, have considered the *first* kind of incomplete definition (viz. that which defines a connotative name by a part only of its connotation, but a part sufficient to mark out correctly the boundaries of its *de*notation) as a complete definition. But, in order thus to satisfy them, it was necessary that all the attributes employed

[**This paragraph disappeared in the rewriting.*]

should really form part of the connotation of the term: because any attribute not connoted by the term would not in their estimation have been part of the *essence* of the class, & would not therefore have answered their purpose of discriminating the real nature of that particular class from that of other classes. Our *second* kind of incomplete definition, therefore, that which defines a connotative name by means of its accidents, i.e. those of its attributes which are not included in its connotation, has been rejected from the rank of genuine Definition by all philosophers, & has been termed Description.

[¶2] This kind of imperfect definition, however, takes its rise from the same cause as the other, namely, the disposition to be satisfied with a definition which whether it expounds the meaning of the name or not, enables us to discriminate the things denoted by it, from all other things, and consequently to employ the term in predication, without deviating from established usage. This purpose is duly answered by enumerating any whatever of the attributes which happen to be common to all the things composing a class, though perhaps having no connexion with the motives which led to their being formed into a class, & called by a common name. It is only necessary that the definition or description thus formed, should be *convertible* with the name it happens to define; that is, should be exactly coextensive with it, each being predicable of every thing of which the other is predicable. The following are correct definitions of 'man' according to this test: Man is an animal having (by nature) two hands (for all human beings answer to this description, & no other animal does): Man is an animal who cooks his food: Man is a featherless biped.

[¶3] What would otherwise be a mere Description, may be raised to the rank of a true Definition by the peculiar purpose, which the speaker or writer has in view. As has been seen in the preceding chapter, it may for the purposes of a particular branch of science, or for the statement of an author's particular views on some branch of science, be convenient to give to some general name, a special connotation different from its ordinary one. When this is the case, a Definition of the name by means of the attributes which make up this special connotation, becomes on the particular occasion & for the particular purpose a genuine & complete Definition, although in general it would be a mere Accidental Definition, or Description. This actually happens in regard to one of our last examples, "Man is an animal having two hands;" which is a complete and scientific Definition of the word Man, considered as the name of one of the species in Cuvier's classification of animated beings.

[*]In cases of this description, the notion which the ancients had of Definition really applies, & the object of Definition is not to state the meaning of a word, but to expound a classification. The special meaning which Cuvier assigned to the word *man* (quite foreign to its ordinary meaning, though involving no change in the *de*notation of the word,) was incidental to a previously conceived plan of arranging all animals into classes on a certain principle, that is according to a certain kind of distinctions. And since the definition of Man according to its ordinary connotation, though it would have answered all the other purposes of a definition, would not have pointed out the place of the species Man in that particular classification, he gave the word a special connotation, that he might be able to define it by attributes of that kind on which he, for reasons of scientific convenience, had determined to found his division of the animal kingdom.

[**This paragraph disappeared in the rewriting.*]

[§5]

[¶1] We have now said enough on the subject of the two incomplete or unscientific kinds of Definition, & the distinction between them & the complete or scientific kind. We shall now proceed to examine an ancient, & at one time generally prevalent doctrine, which we consider as entirely erroneous, & the source not only while it was universally entertained but even since it has been generally rejected, not only of important errors, but of a great part of the obscurity which still hangs over the real nature of some of the most important processes of the understanding in the pursuit of truth.

The notion to which I allude, is, that definitions of names are not the only, or the most important class of definitions; that Definitions may be divided into two classes, Definitions of Names, & Definitions of Things. The former, it is affirmed, are intended to explain the meaning of a term, the latter, the nature of a thing.

[¶2] This opinion was held by all the ancient philosophers & their followers, except the Nominalists; but as the most widespread schools of modern philosophy have generally been Nominalists, the notion of Definitions of Things has not been in modern times the received notion, & has contributed rather by its consequences than by itself to introduce confusion into the philosophy of logic. It has, however, (along with several other of the errors & misleading modes of expression of the schoolmen, which the author's intellectual indolence prevented him from casting off) recently reappeared in a deservedly popular work, Dr. Whateley's Logic. In a superficial & in some points, erroneous article on that work, published by me in the Westminster Review for January 1828, I made the following observations, which still appear to express sufficiently what I have to say on the question now in issue.

[¶3] "The distinction between nominal & real definitions, between definitions of words & what are called definitions of things, though conformable to the ideas of most of the Aristotelian Logicians, cannot, as it appears to us, be maintained. We apprehend that no definition is ever intended to 'explain & unfold the nature of the thing.' It is some confirmation of our opinion, that none of those writers who have thought that there were definitions of things, have ever succeeded in discovering any criterion by which the definition of a thing can be distinguished from any other proposition relating to the thing. The definition, they say, unfolds the nature of the thing: but no definition can unfold its whole nature; & every proposition in which any quality whatever is predicated of the thing, unfolds some part of its nature. The true state of the case we take to be this. All definitions are of names, and of names only: but, in some definitions, it is clearly apparent, that nothing is intended except to explain the meaning of the word; while in others, besides explaining the meaning of the word, it is intended to be implied that there exists a thing, corresponding to the word. Whether this be or be not implied in any given case, cannot be collected from the mere form of the expression. 'A centaur is an animal with the upper parts of a man & the lower parts of a horse;' & 'A triangle is a rectilinear figure with three sides,' are, in form, expressions precisely similar; although in the former it is not implied that any *thing* conformable to the term, really exists, while in the latter it is; as may be seen by substituting, in both definitions, the word *means* for *is*. In the first expression, 'A centaur means an animal' &c., the sense would remain unchanged; in the second, 'a triangle means,' &c. the meaning would be altered, since it would be obviously impossible to deduce any of the truths of geometry from a pro-

position expressive only of the manner in which we intend to employ a particular sign.

[¶4] "There are, therefore, expressions, commonly passing for definitions, which include in themselves more than the mere explanation of the meaning of a term. But it is not correct to call an expression of this sort a peculiar kind of definition. Its difference from the other kind consists in this, that it is not a definition, but a definition & something more. The definition above given of a triangle, obviously comprises, not one, but two propositions, perfectly distinguishable. The one is, 'There may exist a figure bounded by three straight lines,' the other, '& this figure may be termed a triangle.' The former of these propositions is not a definition at all; the latter is a mere Nominal Definition, or explanation of the use & application of a term. The first is susceptible of truth or falsehood, & may therefore be made the foundation of a train of reasoning: the latter can neither be true nor false; the only character it is susceptible of is that of conformity or disconformity to the ordinary usage of language."

[¶5] The distinction, then, between Definitions of Names, and what are erroneously called Definitions of Things, is that the latter, along with the definition of a name, covertly asserts a matter of fact. This covert assertion is not a definition, but a postulate. It is not an essential, but an accidental proposition. It is an assumption, which is not like a definition, a mere identical proposition, from which no conclusions on matters of fact can possibly be drawn; but, on the contrary, may be made the foundation on which to build a whole fabric of scientific truth.

[¶6] We have on a former occasion remarked, that those philosophers, who overthrew Realism, have very generally retained in their philosophy numerous propositions which could only have a rational meaning as part of a realistic system. It had been handed down from Aristotle & perhaps from still earlier times as an obvious truth, that the science of Geometry is deduced from definitions. This, so long as a Definition was supposed to be a proposition "unfolding the nature of the thing," did well enough. But Hobbes came, and after scattering to the winds the notion that a Definition is any thing but an explanation of the meaning of a name, continued nevertheless to affirm as broadly as any of his predecessors, that the αρχαὶ, *principia*, or original premisses of mathematics, & not only of mathematics, but of science in general, are Definitions: Thus producing the monstrous paradox (which for years confused the intellect of him who is now expressing his sense of its absurdity) that a whole system of scientific truth, nay, all truth at which we arrive by reasoning, is deduced from the mere arbitrary conventions of mankind concerning the signification of words.

[¶7] I know it will be said that in order that any scientific truths may be deducible from our definitions, those definitions must be framed conformably to the phenomina of nature, that is, things must actually exist, conformable to the definition, i.e. possessing the collection of attributes which it enumerates. This correction being applied to the doctrine, it will stand thus: No truths can be deduced from a definition, unless it tacitly involves a proposition affirming the real existence of a thing answering to the definition, & unless this proposition thus tacitly assumed be true: But if this other proposition, covertly involved in the definition, be true, then we may deduce other truths—not from this tacit proposition, but from the definition. Surely we need not refute this. The other truths, if they follow at all, follow from the tacit assumption, not from the definition.

[¶8] Take, for instance, the definition of a circle, as laid down in Euclid's

Elements: & which, when analysed resolves itself into two propositions, one an assumption with respect to a matter of fact, the other a genuine definition. "A figure may exist, having all the points in the line which bounds it, equally distant from a single point within it." "Any figure possessing this property is called a circle." Now let us see which of these propositions it is, on which Euclid's demonstrations depend. "About the centre A describe the circle BCD." Is there not here a manifest assumption that a figure such as the definition expresses *may* be described? which is no other than the postulate, or covert assumption, involved in the so called definition. But whether that figure be called a circle or not, is quite immaterial to the conclusion. Again, the circle being described, "the radius BA is equal to the radius CA;" from what does this follow? from the arbitrary meaning of the word? or from the tacit assumption of the possibility of a figure of which all the radii are equal? We need not carry the analysis further.

[¶9] It seems hardly necessary to dwell at so much length upon what is so obvious; but when a distinction, however self-evident, has been long confounded, by persons of indisputable intellect, it must not be quitted until it is familiar. We will therefore point out one of the most glaring of the many absurdities which follow from the supposition that Definitions, as such, are ever premisses in any of our reasonings, except those which relate to words only. This is, that we may by an argumentation strictly correct according to logical rules, deduce from true premisses a false conclusion. Let us begin by laying down the following definition:

"A centaur is an animal having the fore parts of a man & the hinder parts of a horse."

[¶10] No one can deny the correctness of this proposition, considered as a definition. The tacit assumption, indeed, (if there were any such assumption in this case) of the existence of an object with properties corresponding to the definition, would be false. Now then we frame the following syllogism:

A centaur is an animal having the hinder parts of a horse:
But a centaur is an animal having the fore parts of a man;
Therefore
Some animal or animals having the fore parts of a man,
have the hinder parts of a horse.

[¶11] A syllogism strictly correct in the first mode of the third figure, & in which both the premisses are true, & yet the conclusion false. This is as every Logician knows, absurd. The conclusion being false & the syllogism correct, the premisses cannot be true. But the premisses considered as parts of a definition are perfectly uncontrovertible. It is clear, therefore, that the real premisses in this syllogism are not the definitions, but the tacit assumptions involved in them, of the existence of objects conformable to them; thus: A centaur is a *really existing* animal with the hinder parts of a horse; & so forth. Now these implied premisses being false, the falsity of the conclusion presents no absurdity. [¶12] If we would determine what conclusion follows from the same ostensible premisses when the tacit assumption is left out, let us, according to the recommendation in the Westminster Review, substitute *means* for *is*. We then have

A centaur is a *word meaning* an animal with the hinder parts of a horse:
A centaur is a *word meaning* an animal with the fore parts of a man:
Therefore
Some *word or words which mean* an animal with the fore parts of a man, also
mean an animal with the hinder parts of a horse:

where the conclusion as well as the premisses is true & is the only kind of conclusion which can ever follow from a definition, namely a conclusion relating to the meaning of words.

[¶13] We need not illustrate any further the difference between a Definition, & the tacit assumption of a matter of fact, which is sometimes involved in it. We shall only further remark, to show in what cases that assumption is to be understood as being made, & in what cases not—that unless we declare the contrary, we always convey the impression that we intend to make the assumption, when we profess to define any name which is already known to be a name of really existing objects. This is the reason why it was doubtful whether such an assumption was included in the definition of a centaur, & not doubtful that it was included in the definition of a circle.

[§7]

[¶1] Although Definitions are of names only, & not of Things, it is nevertheless true, that how to define a name may be not only an enquiry of considerable difficulty & intricacy, but one which turns upon considerations going deep into the nature of the things which are denoted by the name. Such, for instance, are the great enquiries which form the subjects of the most important of Plato's Dialogues, as, "What is rhetoric" the subject of the Gorgias, or "What is justice," that of the Republic. Such also is the question scornfully asked by Pilate, "What is truth?" and the great question with speculative moralists in all ages, "What is virtue."

[¶2] It would be a complete mistake to represent these difficult & noble enquiries as having nothing in view, but to ascertain the conventional meaning of a name. They are enquiries not so much to determine what *is*, as what *shall be*, the meaning of a name: which like all practical questions of nomenclature, requires for its solution that we should enter very deeply into the properties not only of names but of the things named.

[*]The principles of philosophical nomenclature will form the subject of one of the last chapters of this work, as the whole field of Logic must be surveyed before all the considerations on which the goodness or badness of a nomenclature depends, can be properly estimated. In that chapter, the apparent paradox which we have just noticed, would naturally be cleared up; but it appears desirable to give an anticipated solution here, as without it the theory of Definition, considered as a mere theory, would remain both obscure & imperfect.

[¶3] Although the meaning of every concrete general name, resides as we have seen, in the attributes which it connotes; yet the objects received names before the attributes, as appears from the fact that almost all abstract names in all languages are compounds or derivatives of the corresponding concrete names. Connotative names, therefore, were after proper names, the first which were used. The meaning of a connotative term lies as we have so often observed, in the connotation; & in the simpler cases, no doubt, a distinct connotation was present to the minds of those who first used the name, & was distinctly intended by them to be conveyed by it. Thus, the first person who used the word *white*, in speaking of snow or any other object, had, no doubt, in his mind a perfectly distinct idea of whiteness, & knew that to be the quality, & the only quality, which he meant to predicate of snow in calling it white.

[**This paragraph disappeared in the rewriting.*]

[¶4] But when the qualities by which objects are discriminated from one another, are not of so palpable & easily ascertainable a kind; & in particular where the resemblances & differences of objects arise not from any one quality but from a number of qualities, the effects of which are so mixed up together as not to be easily distinguished from one another; it often happens that names are applied to objects, with no distinct connotation present to the minds of those who apply them: In naming a new object by an old name, all that their minds are conscious of is a general resemblance between the new object & all or some of the old & familiar objects which they have been accustomed to call by that name. This, as we have seen, is the law which even the mind of the philosopher must follow, in giving names to the simple elementary feelings of our nature: but where the things to be named are complex wholes, which, if they resemble, resemble not in all points alike, but in some of their parts, qualities or features only, or in some more than others, a philosopher is not satisfied when he merely finds himself struck by a general resemblance; he examines & discovers what particulars the resemblance consists in; & he will only give the same name, to things which resemble one another in the same definite particulars. The philosopher, therefore, uses all his general names with a definite connotation. But language was not made, & can only in a small degree be mended, by philosophers.[*] In the minds of those by whom language is made, general names (& especially the names of large & complex classes which embrace numerous individuals not at all, or not accurately known to mankind in general) connote nothing but a vague gross resemblance to the objects which they were earliest or have been most accustomed to call by those names. When, for instance, ordinary persons predicate the words *just* or *unjust* of any action, *refined* or *vulgar* of any expression, attitude or gesture, *statesman* or *charlatan* of any personage figuring in politics, they do not mean to affirm of those various *subjects*, any distinct *attributes* of whatever kind; they merely recognize, as they think, some general resemblance, more or less vague & loose, between them & some other things, which they have been accustomed to denominate or to hear denominated by those appelations.

[¶5] Language, as Sir James Mackintosh used to say of governments, "is not made, but grows:" a name is imposed not at once & by premeditation upon a *class* of objects, but is first applied to one object, & then passes by successive transitions to another & another. By this process (as has been remarked by several writers, among others by Dugald Stewart in his Philosophical Essays) a name sometimes passes from one object to another, & from that to a third & so on, each time by reason of a resemblance between the new object, & the last link in the previous chain, until at last it becomes extended to things which have nothing whatever in common with the first things to which the name was given: these, on the other hand, do not drop the name, which, consequently now denotes a confused huddle of objects having nothing whatever in common; & connotes nothing at all, not even a vague & general resemblance.

When a name has got into this state, in which by predicating it of any object we assert positively nothing at all about the object, it has become utterly unfit for the purposes of philosophy or thought, & can only be made serviceable by stripping it of some part of its multifarious *de*notation, & confining it to objects possessed of some attributes in common, which it may be made to connote. Such

[**Gathering* J *begins with* phers *of* philosophers. *This gathering, which concludes the equivalent of* Book I, *is three folios short, and the final nine-and-one-half folios are blank.*]

are the inconveniences of a language which "is not made but grows." It requires, like the roads which are not made, but make themselves, to be continually remade in order to be passable. [¶7] At the same time it is necessary to remark, that the study of the spontaneous growth of languages is of the utmost importance to the philosopher who would logically remake them, & is indeed often his best guide to that classification of objects which is even philosophically the best. We do not allude merely to the inconveniences & difficulties of altering the established classifications, & disturbing the correctness of received propositions by altering the meaning of the names in which they are expressed. The classifications rudely made by established language, are very generally, when retouched as they almost always require to be, by the hands of the philosopher, in themselves the classifications best suited to many of his purposes. These classifications, when compared with those of a philosopher, are like the customary law of a country, which grows up as it were spontaneously, compared with laws methodized & digested into a code: the former are far inferior in practical utility to the latter, but being the result of a long though unscientific course of experience, they contain the greater part of the materials out of which the systematic body of written law may & ought to be formed. In like manner the established grouping of objects under a common name, though usually founded on a gross & general resemblance, is evidence, in the first place, that the resemblance is obvious, & therefore considerable, & in the next place that it is a resemblance which has struck great multitudes of persons during a long series of years or ages. Even when a name, by successive extensions of its application, comes to be applied to things among all of which there does not exist even a general resemblance, still at every step in its progress we shall find such a resemblance; & these transitions of the meaning of words are often an index to real connexions between the things denoted by them, which might otherwise escape the notice even of philosophers who, from using a different language, or from any other difference in their habitual associations, have had their attentions fixed in preference upon some other aspect of those things. The history of philosophy abounds in striking instances of oversights of this nature, which would not have been committed, if the philosopher had seen the hidden link which connected together the seemingly disparate meanings of some ambiguous word.*

[¶8*] Words, then, being often used by the vulgar, without any distinct connotation, except that of a general & gross resemblance among the things which

*[¶7,n] "Few people" (I have said in another place) "have reflected how great a knowledge of Things is required to enable a man to affirm that any given agreement turns wholly upon words. There is, perhaps, not one of the leading terms of philosophy which is not used in almost innumerable shades of meaning, to express ideas more or less widely different from one another. Between two of these ideas a sagacious & penetrating mind will discern, as it were intuitively, an unobvious link of connexion, upon which, though perhaps unable to give a logical account of it, he will found a perfectly valid argument, which his critic, not having so keen an insight into the *things*, will mistake for a fallacy turning on the double meaning of a term. And the greater the genius of him who thus leaps over the chasm, the greater will probably be the crowing & vain glory of the mere Logician who, hobbling after him, evinces his own superior wisdom by pausing on its brink & giving up as desperate his proper business of bridging it over."

Examiner Newspaper for 22d April 1832, review of Mr. George Cornewall Lewis's "Remarks on the Use & Abuse of some Political Terms."

[**The next three paragraphs were reduced by conflation and rewriting into* ¶8.]

they denote; it becomes necessary for the philosopher, to take precautions against the deceptious consequences likely to be produced by thus classing objects together on account of a mere general likeness, without analysing it & ascertaining what it depends upon. For we usually find that as soon as two things become habitually classed together, & called by the same name, a disposition arises to believe that any thing which is true of the one, is true of the other also. It is hence of the utmost importance in philosophy, that whenever objects are to be classed together & named alike, it shall be distinctly known how far the resemblance which gives occasion to their being so classed, extends, & what it consists in; that it may be known how far the inferences which are sure to be drawn respecting ulterior resemblance, are well-founded; and for this among [other] reasons, it is also of importance, that objects should be classed together on account of those resemblances by preference, which lead to the greatest number of interesting consequences, (this as we shall see hereafter is the principal feature in the idea of what is called a Natural Classification) & which are an index, therefore, to the greatest number of other resemblances, & those of a kind most likely to excite attention. But, whatever the resemblances may be, it is of the first importance, that they should be distinctly ascertained & defined; & that the name, which is given to the resembling objects, may acquire a distinct instead of a vague connotation; & by acquiring a distinct connotation may become susceptible of Definition.

And thus it is that the Definitions of names become subjects of enquiry & controversy. But in so far as that enquiry or controversy relates to the properties of things, & not to the mere usage of language, it will be found to affect not the definition itself, but the suppressed proposition, which we have already stated to be tacitly included in every Definition of a name which is known to be the name of any real object.

When we enquire into the meaning of such a name, & our enquiry consists of any thing else than a mere comparison of verbal authorities, we tacitly assume that a meaning must be found for it, compatible with its continuing to denote all or the greater part of the things of which it is commonly predicated. The enquiry, therefore, must have for its object to ascertain, first whether there really exists among *all* the things usually denoted by the name, any general resemblance; & next, supposing that there does, what that resemblance consists in. In other words, to enquire into the Definition of a name, is to enquire what attributes may be predicated in common, of all the various things denoted by the name: &, among those common attributes, what are those, the possession of which gives to all those things the character of resemblance, which has led to their being classed together. Of these two enquiries, the first is a case of comparison among a variety of objects, to ascertain their resemblances, and differences; the latter is a question of causation.

[¶9] In giving, therefore, a distinct connotation to the general name, the philosopher will endeavour to fix upon such attributes as, while they are common to all the things usually denoted by the name, are at the same time those which are in themselves of most importance, either from the number, the obviousness, or the interesting character of the consequences to which they lead. He will endeavour to select such *differentiæ* as lead to the greatest number of interesting *propria*. For it is these rather than the more obscure and recondite qualities on which they usually depend, which give that general character & aspect to a set of objects, which determine the groups into which they naturally fall. But to mount

up to the more hidden agreement on which these obvious & superficial agreements depend, is often one of the most difficult of scientific problems. As it is among the most difficult, so it seldom fails to be among the most important. And since upon the result of this enquiry respecting the causes of the properties of a class of things, there incidentally depends the question what shall be the connotation of a name; some of the most profound and most valuable investigations which philosophy presents to us, have been introduced by, & have offered themselves under the guise of, enquiries into the Definition of a Name.

[Book II: Of Reasoning]

OF INFERENCE, OR REASONING[*]

[Chapter i: Of Inference, or Reasoning, in General]

[§*1*]

[¶4] In the most extended acceptation of the term, we may be said to reason, whenever we draw a conclusion; whenever we infer one proposition from another. In the narrower sense, reasoning is confined to that particular kind of inference which is called ratiocination, and which admits of being put into the form of a syllogism.

To the particular character of that kind of inference which is termed reasoning in the limited sense, we shall presently advert. We shall first take a general view of the various cases in which inferences may be legitimately drawn.

[§2]

[¶1] The first class of cases which we shall mention, is a class in which the inference is rather apparent than real, and which requires notice chiefly in order that it may be distinguished from cases of inferences properly so called. This is where from one proposition we seem to infer another, which, however, when analysed appears to be merely a repetition of the same, or part of the same, assertion, put into other words. All the cases mentioned in books of Logic as examples of the *Æquipollency*, or equivalence, of propositions, are cases of this sort. [¶2] Another case is where, from a universal proposition, we affect to infer another which differs from it only in being particular: as All A is B, therefore some A is B: No A is B, therefore Some A is not B. This is plainly not to deduce one proposition from another, but to repeat the same proposition a second time; not, indeed the whole of it, but as great a portion of it as we have occasion for.

[¶4] The most complex case of this kind of inference or rather apparent inference, is what is called the Conversion of Propositions; that is, turning the predicate into a subject, and the subject into a predicate, and framing out of the same terms thus reversed, another proposition, which must be true if the former is true. Thus, from the proposition, Some A is B, we may infer that Some B is A. From this, No A is B, we may infer that No B is A. From the proposition All A is B, it cannot be inferred that All B is A; though all water is liquid, it does not follow that all liquids are water, but it follows that some are so. The proposition All A is B is therefore legitimately convertible into Some B is A. This is called convertion *per accidens*. From this, Some A is not B, we cannot even infer that Some B is not A: for though some men are not cobblers, it does not follow that some cobblers are not men. The only legitimate conversion, if such it can be called, of a particular negative proposition, is thus; Some A is not B, therefore some things which are not B are A; which is called conversion by contraposition.

[**Gathering* K *(formerly* G*) begins on this folio. Gatherings* K *through* M *(formerly* G *through* I*) are in Scribe A's hand.*]

But here the predicate and subject are not merely reversed but changed; instead of [A] and [B] the terms of the new proposition are [things which are not B] and [A]. The proposition Some A is not B, is first changed into the æquipollent proposition, Some A is a thing which is not B; the proposition is now no longer a particular negative, but a particular affirmative, and therefore admits of being converted in the first mode, or that which is called *simple* conversion.

[¶5] In all these cases it is evident that there is not really any inference, that is to say, any new truth in the conclusion, not already asserted in the premises. The fact asserted in the conclusion is either the very same fact, or part of the same fact, which was asserted in the original proposition. This is plain from our analysis of Predication. Thus, when we say that Some A is B, we mean that the attributes connoted by A and those connoted by B, are sometimes found to coexist in the same subject: now this is also precisely what we mean, when we say that some B is A; which, therefore, is not another proposition inferred from the first, any more than the English translation of Euclid's Elements can be considered as a set of ulterior truths deduced from those contained in the Greek original. Again, when we say that No A is B, we mean that the attributes connoted by A & those connoted by B never coexist in the same subject; which is also the meaning, & the whole meaning, of the proposition, No B is A. When we assert that, All A is B, we assert not only that the attributes connoted by A and those connoted by B sometimes coexist, but that the former never exist without having the latter joined with them. Now the proposition, Some B is A, merely expresses the first half of this truth, without the other half, and therefore has been asserted by implication when we affirmed both halfs together in the proposition, All A is B. But, That all B is A, in other words that the attributes connoted by B never exist but in conjunction with those connoted by A, has not been asserted, nor can it be inferred. In order to reassert, in an inverted form, the whole of what was involved in the proposition All A is B, we must convert it by contraposition, thus, Nothing which is not B is A. These two propositions are exactly equivalent, & may be mutually substituted for one another: for to say that when the attributes of A are present those of B are present, is to say that when the latter are absent the former are absent.

[¶6] In a manual of logic for young students, it would be proper to insist at greater length upon the conversion & æquipollency of propositions. For, although that cannot be called reasoning or inference which is merely a reassertion in other words of what has been asserted before, yet there is no more important habit, nor any one the cultivation of which falls more strictly under the province of the art of logic, than that of readily & at once discerning the identity of an assertion, when disguised in language that is dissimilar. That important chapter in logical treatises, which relates to the Opposition of Propositions, and the excellent technical language which logic provides for distinguishing the different kinds or modes of opposition, are chiefly of use for this purpose. Such considerations as these, that contrary propositions may be both false, but cannot both be true, that Sub-contrary propositions may both be true, but cannot both be false, that of two Contradictory propositions one must be true & the other false, that of two subalternate propositions the truth of the universal proves the truth of the particular, and the falsity of the particular proves the falsity of the universal, but not *vice versâ*; all this appears very technical and mysterious at first sight, but when the meaning of the words is explained, the whole is so obvious, that it is apt to be thought little more than solemn trifling to lay it down with the imposing air

of Science: since the same degree of explanation which is necessary to make the principle itself intelligible, would enable the truth which it conveys to be apprehended, in any particular case which can occur, without the aid of the principle. To which I answer, that in this respect, these principles are precisely on the level of geometrical axioms. That things which are equal to the same are equal to one another, is fully as obvious in any particular case, as it is in the general maxim; and if it had never been laid down as a maxim, none of the demonstrations of Euclid would ever have halted for any difficulty in stepping across the gap, which this axiom serves at present to bridge over. Yet no one has ever censured Euclid for giving a list of these self-evident propositions at the head of his treatise: for the best introduction to a Science consists in beginning with those of its truths which can be comprehended with least effort. And the student of logic, in the manipulation even of such truths as those which we have cited above, acquires habits of circumspect interpretation of words; and of taking an exact measure of the length and breadth of every assertion which he utters or which is tendered for his assent, which habits, when raised by culture to adequate constancy & strength, are among the most valuable acquisitions for which the understanding is indebted to logical discipline.

[§3]

[¶1] Having noticed, for the purpose of excluding from the province of Reasoning or Inference properly so called, the cases in which there is only an apparent process from one truth to another, the logical consequent being a mere repetition in other words, of the logical antecedent, we are now prepared to consider the various cases of inference in the correct acceptation of the term, that is, the deducing of one distinct, independent truth, from another.

[¶2] Reasoning, in the widest sense of the term, is popularly said to be of two kinds; reasoning from particulars to generals, and reasoning from generals to particulars. The former is Induction, the latter Ratiocination, or Syllogism. Before interpreting these brief expressions, by others which are longer but more precise, I must observe, that to these two cases of inference a third must be added; reasoning from particulars to particulars. Some will deny that we can legitimately reason in this last mode; and if the word reasoning be understood in its most confined sense, in which it is synonymous with ratiocination or syllogism, the objection must be allowed; but if by reasoning be meant every kind of inference, or every case of concluding one proposition from another, it will presently be shewn that reasoning from particulars to particulars is the foundation of *all* other reasoning, & that no reasoning whatever is legitimate if this is not. The grounds of which assertion, although they cannot as yet be fully stated, may be indicated by observing that every general proposition ultimately rests upon, or rather resolves itself into, particulars, so that particulars are the original premises of every argumentation.

[¶3] To say nothing further at present on this topic, which will be amply discussed hereafter, it is necessary to observe that the expressions, to reason from particulars to generals, & to reason from generals to particulars, do not adequately mark out, without the aid of a commentary, the boundaries between Induction and Ratiocination. The correct expressions would be, to infer any proposition from propositions *less general* than itself, and to infer it from propositions *equally* or *more* general. When, from the observation of a number of individual instances,

we infer a general proposition, or when, from a number of general propositions we conclude another more general still, this is *Induction*. When, from a general proposition, by combining it with other propositions (for else [*sic*] we cannot) we infer a proposition *equally* general, or *less* general, or not general but individual, this is Ratiocination. In short, when the conclusion is more general than any of the premises, the argument (if it be a legitimate argument at all) is Induction. When the conclusion is less general or equally general with the largest of the premises, but not more so; the argument is Ratiocination.

[¶4] As all experience begins with particulars, and proceeds from thence to generals, it would be more conformable to what seems the natural order to treat of Induction before touching upon Ratiocination. There are, however, advantages which will gradually manifest themselves as we proceed, in making the analysis of Ratiocination preceed that of Induction. And, in general, it will be found advantageous, in treating of a Science which has for its chief object to trace all our knowledge to its source, to commence with the later rather than with the earlier stages of the process of acquiring knowledge, and to trace derivative truths backward to those prior truths from which they are deduced and on which they depend for their evidence, before attempting to point out the original spring from which they all equally take their rise.

[¶5] With respect to Induction, then, we shall only for the present observe, that it is a process of real, genuine *inference*; that the conclusion embraces more than is contained in the premisses. The general principle or law which we are said to discover—the general proposition in which we embody the result of our experience,—covers a much larger extent of ground than the individual experiments which form its basis. A principle ascertained by experience is not the mere summing up of what we have observed in the cases we have examined; it is a conclusion, founded on those cases, and expressive of our belief, that what we there found to be true, is true in an indefinite number of other cases which we have not examined.—The nature and grounds of this inference, and the conditions required to render it legitimate, we shall attempt to analyse hereafter, in the chapter on Induction. We shall now merely remark by way of suggestion, that the inference is drawn in conformity to the received principle, that the course of nature is uniform, or (as it is sometimes very inadequately expressed) that the future will resemble the past.

In Induction, then, we proceed from truths which we know, to truths which we did not before know: from facts certified by observation, to facts which we have not observed, and perhaps could not have observed—future facts, for example; but which we believe, with the fullest conviction, upon the sole evidence of the Induction itself.

[¶6] Having noticed this, which is the only truth with respect to Induction to which it will be necessary to advert in the exposition of Syllogism, we proceed at once to that other branch of the subject.

OF RATIOCINATION, OR SYLLOGISM

[Chapter ii: Of Ratiocination, or Syllogism]

[§1]

[¶1] The analysis of the Syllogism has been so fully and admirably given in most of the common manuals of logic, that in the present work, which is not designed as a manual, it is sufficient to recapitulate the leading particulars of the analysis, *memoria causâ*, to serve as a foundation for the subsequent reflections.

[¶2] To a legitimate syllogism it is essential that there should be three & not more than three, propositions; namely, the proposition to be proved, called the conclusion, and the two propositions which prove it, called the premisses. It is essential that there shall be three, and no more than three terms, viz: the subject & predicate of the conclusion, and another term called the middle term which must be found in both premisses. The predicate of the conclusion is called the major term of the syllogism. As there can be but three terms, the major & minor terms must each be found in one, and only one, of the premisses, along with the middle term, which is in them both. That premiss which contains the middle term and major term, is called the major premiss; that which contains the middle term and the minor term is called the minor premiss.

[¶3] Syllogisms are divided by some logicians into three *figures*, by others into four, according to the position of the middle term; which may be the *subject* of both premises, the *predicate* of both, or the subject of one, and the predicate of the other. The commonest case is that in which the middle term is the subject of the major premiss and the predicate of the minor. This is called the first figure. When the middle term is the predicate of both premisses, the syllogism is said to be in the second figure; when the subject of both, in the third. In the fourth figure the middle term is the subject of the minor premiss and the predicate of the major: those who do not reckon more than three figures, include this in the first.

[¶4] These figures are again subdivided into modes, according to what are called the *quantity* and *quality* of the propositions, that is to say, according as the propositions are universal or particular, affirmative or negative. The following are examples of all the legitimate modes, that is, all those in which the conclusion legitimately follows from the premisses: C is the major term, A the minor, B the middle term.

First Figure

All B is C	No B is C	All B is C	No B is C
All A is B	All A is B	Some A is B	Some A is B
ergo	ergo	ergo	ergo
All A is C	No A is C	Some A is C	Some A is not C

Second Figure

No C is B	All C is B	No C is B	All C is B
All A is B	No A is B	Some A is B	Some A is not B
ergo	ergo	ergo	ergo
No A is C	No A is C	Some A is not C	Some A is not C

THIRD FIGURE

All B is C	No B is C	Some B is C	All B is C	Some B is not C	No B is C
All B is A	All B is A	All B is A	Some B is A	All B is A	Some B is A
ergo	ergo	ergo	ergo	ergo	ergo
Some A is C	Some A is not C	Some A is C	Some A is C	Some A is not C	Some A is not C

FOURTH FIGURE

All C is B	All C is B	Some C is B	No C is B	No C is B
All B is A	No B is A	All B is A	All B is A	Some B is A
ergo	ergo	ergo	ergo	ergo
Some A is C	No A is C	Some A is C	Some A is not C	Some A is not C

[¶6] The reasons why these premises are legitimate, that is, why if the premisses be true, the conclusions must necessarily be so, and why this is not the case in any other possible Mode except these alone, any person taking interest in the present speculations, may be presumed to have either learned from the common books of logic, or to be capable of divining by himself. The reader may however be referred to Dr. Whately's logic, where he will find stated with uncommon perspicuity, almost everything which it is necessary to know on this part of the subject.

[¶7] All valid ratiocination; all reasoning by which from general propositions we infer propositions equally or less general, may be transformed into a series of syllogisms according to some of the above formulæ. The whole of Euclid, for instance, might easily be thrown into a series of syllogisms regular in mode and figure.

[¶8] Although a syllogism according to any of the above formulæ is a valid argument, that is, conclusive from the mere form of the expression; it has been shewn by logicians that all valid ratiocinations may be stated in syllogisms of the first figure alone. The rules for throwing an argument in the other figures into the first figure are called the rules for the *reduction* of syllogisms. It is done by the *conversion* of one or other, or both, of the premisses. Thus an argument in the first mode of the second figure, as

No C is B
All A is B
ergo
No A is C

is reduced as follows: The proposition No C is B, being converted, stands thus, No B is C, which, as we have shewn in treating of conversion, is merely the same assertion put into other words—the same fact, differently expressed. The argument will then stand thus

No B is C
All A is B
ergo
No A is C,

which is a good syllogism, in the second mode of the first figure. Again, an argument in the first mode of the third figure would be

All B is C
All B is A
ergo
Some A is C.

Now the minor premiss, All B is A, being converted *per accidens*, gives this proposition, Some B is A [*sic*]: which, though it does not express the whole of the fact previously asserted, expresses part of it, and must therefore be true, if the former proposition be true: we have, therefore, the following syllogism in the third mode of the first figure:

All B is C
Some A is B

from which it obviously follows that

Some A is C.

[¶9] In the same manner, or in a manner which is easily suggested by the above exemplification, every mode of the second, third, and fourth figures may be reduced to some one mode of the first. Every valid ratiocination therefore may be stated in one of the following forms.

Every B is C	No B is C
All A } is B Some A }	All A } is B Some A }
ergo	ergo
All A } is C Some A }	No A is } C. Some A is not }

Or dropping the signs A, B & C, and replacing them by more significant expressions;

[¶10] To prove an affirmative, the argument must admit of being stated in this form:

All animals are Mortal
But
All men }
Some men } are animals
Socrates }
ergo
All men }
Some men } are mortal.
Socrates }

[¶11] To prove a negative the argument must be capable of being thrown into this form

No persons capable of reflection are incapable of Moral excellence
But
All negroes }
Some negroes } are persons capable of reflection
Mr. A's negro }
ergo
No negroes are }
Some negroes are not } incapable of moral excellence.
Mr. A's negro is not }

[¶13] Not only does all ratiocination admit of being thrown into one or other of these two forms, but when stated in these forms its conclusiveness is more obvious at the very first glance than when it is stated in any other form though equally legitimate. These forms, moreover, strike every understanding as being those in which the ideas involved in a ratiocination would most naturally and spontaneously arrange themselves. We may therefore consider the two forms cited above as the universal types of all correct ratiocination: the first, when the conclusion arrived at is affirmative, the last, when it is negative.

[§2]

[¶1] On examining these formulæ, we find that in both of them, one of the premisses, that which is called the major, is a universal proposition; & according as this is affirmative or negative, the conclusion is so too. All ratiocination starts from a *general* proposition, principle, or assumption: a proposition in which a predicate is affirmed or denied of an entire *class*, that is, in which some attribute, or the absence of some attribute, is ascribed to an indefinite number of objects possessing a common name.

[¶2] The other premiss is always affirmative, and asserts that some other class of objects, or some part of some class, or only some individual, belongs to the class, of the whole of which something had been affirmed or denied in the major premiss. And the conclusion, of course, necessarily follows; to this effect, that the attribute which was asserted to be possessed by the entire class, must, if that be true, be possessed by the objects which have been affirmed to be included in the class; or that the attribute which was asserted not to be possessed by any part of the class, cannot, if that be true, be possessed by the objects which have been affirmed to belong to the class.

[¶3] This, which is a correct statement of what takes place in all cases of ratiocination, has been generalised and erected into a logical maxim. It is laid down in most treatises on Logic, that all Ratiocination rests upon one principle; or, in other words, that every argument consists in affirming in some particular case, a truth which expressed generally forms the following maxim: That whatever can be truly affirmed or denied of a class, can be truly affirmed or denied of everything belonging to that class. This fundamental axiom has been termed by the schoolmen, the *dictum de omni et nullo.*

[¶4] Now, of this maxim, considered as the principle of all reasoning, we may venture to affirm, that it naturally belongs to a system of metaphysics extremely remote from that which is at present received by any philosopher in this country, & perhaps even in the world. At the time when *universals*, as they were termed, were supposed to have a separate objective existence, distinct from the individual objects which were classed under them, the *dictum de omni* not only expressed a definite meaning, but contained something which, assuming the above theory, was very important to be known, namely this, that the attributes, which we somehow contrived to discover in the universal, the *genus* or *species*, the *substantia secunda*, as it was termed, are likewise attributes of all the individual objects, of which that universal can be truly predicated. The maxim, in short, asserted that particular substances, & the supposed universal substances, were mysteriously connected in such a manner, that the entire nature and properties of the universal substance formed part of the nature & properties of each of the particular substances called by its name. On the scholastic system, this, as I have just observed,

was a substantive fact or truth; by the knowledge of which we were made wiser. But now, when it seems to be generally admitted, that a universal, a class, a genus or species, is not an entity *per se*, but neither more nor less than the particular substances themselves which are placed in the class, and that there is nothing real in the whole matter except the individual objects, a common name given to them, and common attributes indicated by the name; what, I should be glad to know, do we learn by being told, that whatever can be affirmed of a class, may be affirmed of every object contained in the class? The class *is* nothing but the objects contained in it; and the *dictum de omni* is nothing better than the identical proposition, that whatever is true of all of a certain number of objects, is true of each of these objects. If all ratiocination were merely the application of this general maxim to some particular case, the syllogism would indeed be, what it has so often been asserted to be, solemn trifling. The *dictum de omni* is an axiom precisely on a par with the celebrated truth, Whatever is, is; & decidedly less instructive than the equally renowned aphorism, It is impossible for the same thing to be and not to be. It can only be considered as having a meaning, by being complaisantly understood as a paraphrastic & circuitous definition of the word *class*.

[¶5] An error which seemed completely refuted and expelled from science, often has only to put on a new suit of phrases, in order to be cordially welcomed back to its old quarters, and there repose unquestioned for another cycle of ages. Thus it has been with the scholastic dogma that genera and species are a peculiar sort of substances, and that all knowledge is only the knowledge of these universal substances, and not of the infinite number of individual substances which are classed under them. Whether disguised under the *abstract ideas* of Locke, (whose speculations, however, have been, I conceive, less vitiated by it than those of any other writer who has been infected with it before or since) the ontology of Cousin & the later Kantesians [*sic*], or the ultra-nominalism of Hobbes, this same doctrine has ever continued to poison philosophy. Having been accustomed to consider philosophical investigation as essentially consisting in the study of universals, men did not drop this habit when they ceased to regard universals as possessing an independent existence; and even those who came to consider them as mere names, still could not free themselves from the notion that the investigation of truth consisted entirely or partly, in some kind of conjuration or juggle with those names. Few philosophical opinions have ever been more widely spread than this, that the process of arriving at new truths by reasoning, in all sciences, or at any rate in all those to which Algebra is applied, consists in the mere substitution of one set of arbitrary signs for another. If there is any process in sorcery or necromancy more preternatural than this, I shall be much surprised. The culminating point of this philosophy in modern times is the well known aphorism of Condillac, that a Science is nothing, or scarcely anything, but *une langue bien faite*. A paradox, which, if divested of its epigrammatic dress, amounts to this, that we know the whole nature and properties of objects, or as much of them as is within the reach of our faculties, if we know what names they are called by. Can it be necessary to do more than simply affirm that none, not even the smallest and most trifling knowledge with respect to things, ever was, or ever can be originally got by any conceivable manipulation of mere names; that whatever can be learnt from names, is only what somebody, who used the names, knew before us; that the function of names is exclusively confined to being a contrivance for remembering & for communicating our thoughts; and that their

use in acquiring knowledge, immense as it is, amounts only to the advantage, in so difficult an operation, of any contrivance which aids the memory, and assists communication with others? Doubtless, it is necessary to do something more than simply affirm this: it is necessary to explain the real process by which those things are done, which so many have imagined to be done by a mere arrangement of words. But when this shall be effected, the proposition just stated will not be rendered at all more obvious, than it is in its own nakedness the first moment it is uttered.

[§3]

[¶*1*] If truths cannot be discovered or proved by a process of naming, neither can they by a process of classification. It has been observed in a preceeding chapter, that classification does not precede, but follows our knowledge; and that we do not affirm a predicate of a subject because we have placed that subject in a class, but, on the contrary, we place it in the class, because we find that the predicate in question may be truly affirmed of it.

What is the real nature of a process of ratiocination, and what the principle or maxim of which every syllogism is one of the applications, will best be understood by remembering what it was which we found to be the real nature and import of every proposition or predication.

We found that the matter-of-fact asserted in every proposition, not identical, and which constitutes the real and only immediate object of belief when we assent to the proposition, is always the conjunction or non-conjunction of two *phenomena*: or, to express the same idea in other words, the coexistence or non-coexistence of two *attributes* or sets of *attributes*, in one and the same subject. I have already observed, that every *phenomenon*, when analysed, resolves itself into a sensation, thought, emotion, or volition, or a series of such, with or without a substance or object which excites them: and that an attribute is nothing but a name for the sensation, thought, emotion, or volition, considered as excited by that substance or object. But to this more recondite analysis, we need not do more than advert, since it is not necessary to the proof of what we have to advance; and indeed, one of the objects which I propose to myself in this work is to shew, that Logic is common ground to the partisans of different metaphysical sects; and that all its most valuable truths may be apprehended and assented to by persons adopting the most opposite views of the higher or transcendental metaphysics. If therefore I continue to use the received language respecting the distinction between attribute and subject, I again repeat that I intend to prejudge nothing respecting the real nature or ultimate analysis of that distinction, but to assume its existence, as what must be allowed in all systems, either as a distinction in entities themselves or in our modes of viewing them.

[¶2] Since, then, every proposition, if affirmative, asserts, or if negative, denies, the coexistence of two attributes, or sets of attributes; this must be equally the case with propositions arranged in a syllogism. The major premiss, which, as I have already observed, is always universal, asserts that all things which have one particular attribute, have in addition to it a certain other attribute; or else, that they have not. The minor premiss asserts that a given object,* or a given class of objects,† or part of a given class of objects,‡ has the first mentioned attribute; and

*Singular Proposition. †Universal Proposition. ‡Particular Proposition.

the conclusion infers in the one case that it has, in the other that it has not, the second. Thus in the syllogism

All men are mortal
Socrates is a man
therefore
Socrates is mortal

the subject and predicate of the major premiss are concrete connotative terms, *denoting* objects and *connoting* attributes. What the major premiss asserts, is the constant union of those two sets of attributes. Its purport is, that all objects which have the attributes connoted by the word man, have also the attributes connoted by the word mortal. In other words, that the phenomenon which is composed of corporeity, animal life, rationality, and the form called human, never exists without being, at some time or other, terminated by the phenomenon called death.

Now, while the major premiss asserts this, with regard to all objects which have certain attributes, the minor premiss asserts that the individual object called Socrates possesses these attributes, or, in other words, is a phenomenon answering to this description. We therefore conclude that this individual object also possesses the attribute of mortality; in other words, that this phenomenon will also be, at some time or other, cut short by the phenomenon death.

In this example, the minor premiss is a singular proposition. Suppose now that both the premises are general propositions: thus

All B is C
All A is B
therefore
All A is C.

A, B, & C, being connotative terms. The minor premiss asserts that along with the attributes connoted by A are always found the attributes connoted by B. The major premiss asserts, that along with the attributes connoted by B are always found the attributes connoted by C. The conclusion, therefore, follows, that wherever we find the attributes connoted by A, there also will be found the attributes connoted by C.

[¶3] If the major premiss is negative, thus,

No B is C
All A is B
therefore
No A is C

the argumentation is, that the attributes connoted by C never coexist with the attributes connoted by B: but the attributes connoted by B always coexist with those connoted by A: therefore the attributes connoted by C never coexist with those connoted by A.*

*An observation is necessary to prevent misapprehension in case the reader should be inclined to push the analysis further. An attribute, when analysed is merely one or more human sensations, thoughts, emotions, or volitions, considered as excited by an object. When, however, we say that the attribute connoted by a certain name never coexists with the attribute connoted by a certain other name; although both these attributes are really sensations, &c. we do not mean that the two sensations never coexist; for they may coexist casually: we mean only, that they are never both of them excited by the same object: in other words that there is no known cluster or group of

In the same manner, we might analyse all the other cases of the syllogism.

[*]According to this view of ratiocination, the propositions which are concerned in it, whether as premisses or conclusion, are conversant not with the propriety of the application of names, nor with the arranging of objects in classes, both of which are matters of arbitrary convention; but with the conjunction or non-conjunction of *attributes*, in other words of *phenomena*, in other words of objects, and the feelings which those objects exite in us.†

[¶4] We have thus arrived at a preliminary axiom, a first and fundamental principle of all reasoning, different from the unmeaning *dictum de omni et nullo*. This axiom is analogous to those of mathematics, and consists of two propositions. The first is, that things which are constantly conjoined with the same thing, are constantly conjoined with one another. The second is, that a thing which is constantly conjoined with something, from which another thing is constantly *dis*joined, is constantly disjoined from that other thing. Or thus; Two things, one of which is always, and the other never, conjoined with a third thing, are never conjoined with one another.

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sensations or of trains of sensations, into which both of them constantly enter. [*This paragraph, written as part of the text, was marked by JSM to be set off as a note.*]

[**This paragraph, with its note, disappeared in the rewriting.*]

†All propositions not identical, assert either the existence of objects, and of the impressions which those objects produce in our minds; or the order in which (as we mean to affirm) those impressions occur, namely, either simultaneously, or in some particular order of succession. Now whether the impressions are simultaneous or successive, the attributes are said to be simultaneous; for, if an object has the *power* of exciting a particular impression, that is, if we believe that certain suppositions being made, that impression would be felt, we speak of the attribute as already in existence. All propositions, therefore, which are not identical, and in which the predicate and subject are general terms assert that certain attributes are or are not conjoined.

But the existence of our impressions, and the order, whether simultaneous or successive, in which we experience them, is totally independent of human will. The truth, therefore, of propositions and the conclusiveness of syllogisms, is in no respect arbitrary, though the significance of the words in which they shall be expressed, of course, is altogether so.

[Chapter iii: Of the Functions and Logical Value of the Syllogism*]

[§1]

[¶1] It has now been shewn what is the nature of the truths with which the syllogism is conversant, and what the principle on which its probative force or conclusiveness depends. But the question still remains whether the syllogistic process, or, in other words, reasoning from generals to particulars, is or is not a process of *inference*: a process from the known to the unknown, a means by which we come to a knowledge of something which we did not know before.

[¶2] Of this question, the solution is obvious; and no one has ever treated [?] upon the subject without hitting upon it. All logicians allow that a syllogism is vicious if there be anything more in the conclusion than is assumed in the premisses. But this is as much as to say that nothing ever was or can be proved by syllogism, which was not known before. Ratiocination, therefore, is not a process of inference. Syllogism, to which the word reasoning has so often been deemed to be exclusively appropriate, is not even a process of reasoning at all.

But although the principle that a syllogism never proves more than is involved in the premisses, has, as before observed, been admitted by all writers on the subject, the admission has, for the [†]most part, either remained barren of consequences, or has produced none but positively erroneous ones. The acknowledgment thus explicitly made has not prevented one set of writers from continuing to present the syllogism as the correct analysis of the actual process which the mind pursues in establishing that large class of truths which are currently said to be got at by reasoning, as distinguished from induction; while it has induced another set to make the *petitio principii* which they affirm is inherent in every syllogism, a ground for imputing uselessness, futility, and frivolity, to the syllogistic theory itself.

That both these opinions are equally remote from the truth, may I think be conclusively demonstrated: and the real character of the syllogistic process, and of the purposes which it fulfils in philosophy, more clearly shewn than has ever yet been done.

[§2]

[¶1] It must be conceded that in every syllogism, considered as an argument to prove the truth of the conclusion, there is a *petitio principii*. The proposition to be proved is assumed in the major premiss. When we say,

All men are mortal
But
Socrates is a man
Therefore
Socrates is mortal

it is unanswerably urged by the assailants of the syllogistic theory, that the proposition, Socrates is mortal, is presupposed in the more general proposition, All men are mortal: that we cannot be assured of the mortality of all men, unless

[**There is no chapter break here in the Early Draft.*]

[†*Gathering* L *(formerly* H*) begins here. This gathering is two folios short, but the text is continuous with that of Gathering* M.]

we are previously assured of the mortality of every individual man; that if the mortality of Socrates was doubtful before, the same degree of uncertainty must hang over the proposition that all men are mortal, and the general principle, instead of being given as evidence of the particular case, cannot itself be taken for true without exception, until every shadow of doubt which could affect any of the particular cases included in it previously, is dispelled by evidence aliundè: and then, what is left for the syllogism to prove? That, in short, no reasoning from generals to particulars can prove anything: since from a general principle you cannot infer any particulars, but those which the principle itself assumes as preknown.

[*]The justness of these strictures is by no means obviated by the analysis which we have given of the ultimate meaning or import of the syllogism, and the propositions composing it. For, let the argumentation be as follows

Wherever attribute *a* exists, attribute *b* is joined with it:
But *a* is one of the attributes of the object X:
therefore
b is also an attribute of the object X.

The major premiss begs the conclusion, just as much in this mode of stating the argument as in the other. For what does the major premiss assert? That attribute *b* enters into all the combinations of attribute *a*. But X, by supposition, is one of those combinations. Unless, therefore, it was already certain beyond a doubt, that *a* enters into the combination X, the major premiss was prematurely assumed: there were still doubts of its universality; and it could not be legitimately called in to prove that, on the previous establishment of which its own evidence was dependent. The pretended conclusion is a mere reassertion, in other words, of part of the premisses. All A is B, therefore Some A is B, we observed in a former place, is no inferring of a new truth, but a mere reassertion of the old. But the truth is, every syllogism which it is possible to put into words, is precisely analogous, if considered as an argument, to such reasoning as All A is B therefore Some A is B.

[¶2] All this is sufficiently obvious: and if logicians have usually, though unable to dispute it, shewn a strong disposition to explain it away, and to forget it as much as they could, this seems to have arisen from a difficulty which they found in reconciling it with other parts of their knowledge. They knew that the syllogism is a *petitio principii*; but they also knew that truths previously unknown, facts which have not been directly observed, *are* continually got at by way of inference; that subsequent experiment, whenever an opportunity occurs, corroborates their truth; and that the process by which these inferences are drawn, *seems*, at least, to be a process of reasoning from generals to particulars. We believe that William the Fourth is mortal. We do not know this by direct observation, seeing that he is not yet dead. If we were asked how, when this is the case, we know William the Fourth to be mortal, we should probably answer, because *all men* are so. Here, therefore, it may be said, we arrive at the knowledge of an unobserved truth, by a reasoning which is correctly resolved into the following syllogism:

All men are mortal
But
William the Fourth is a man
Therefore
William the Fourth is mortal,

[**The next three paragraphs disappeared in the rewriting.*]

which, consequently, is an instance of an argument from generals to particulars, proving a fact which we did not know before. [¶3] And on the evidence of such cases, which are infinitely numerous, logicians have persevered in affirming that the syllogism is a process of inference, or proof, although none of them has hitherto succeeded in giving any sufficient solution of the apparent inconsistency between that assertion, and the principle expressly laid down by all of them, that if there be anything in the conclusion which was not already included in the premisses, the argument is vicious. One cannot help fancying that if they had suffered themselves to follow out this last proposition to what would have appeared, even to themselves, its necessary consequence, they would have been led to the conclusion that no new truths could be come at by ratiocination; and that this would have seemed to them *a priori* to be evident, had not they been stopped by thinking that the contrary was equally evident *à posteriori*. If they had been perfectly candid in stating to themselves what really passed in their own minds, they would have confessed that they believed a *mystery*; giving credit to two propositions, each of which, separately taken, seemed to them to be perfectly certain, but which they were completely unable to reconcile with one another.

[§3]

[¶2] This difficulty, and apparent paradox, arises, I conceive, from not distinguishing with sufficient clearness between the two parts of the process of philosophizing, the *inferring* part and the *registering* part; and from attending too exclusively to the latter. The mistake committed is like referring a man back to his own notes, for the origin of his knowledge. If a person is asked a question, and is at the moment unable to answer it, he may naturally enough turn to a memorandum which he carries about with him, to refresh his memory. But if he were asked how the fact came to his knowledge, he would scarcely answer, because it was written in his pocket book. Good, if the memorandum was made for him by an angel, or an enchanter; but not if he made it himself.

[¶3] Assuming that the proposition, William the Fourth is mortal, is an inference from the general proposition, All men are mortal, whence do we derive the knowledge of this more comprehensive truth? If it came to us by experience, and not by revelation, the evidence which convinces us of it consists of particular cases. It is because John, and Thomas, and every other person we know of in whose case the experiment has been fully tried, has turned out to be mortal, that we conclude all other men to be so.

All which man can observe, are individual cases. From these all general truths must be deduced; and into these they may be again resolved; for every general truth is but an aggragate of particular truths; a comprehensive expression by which a large and commonly indefinite number of particular facts are denied or affirmed at once.

But a general proposition is not merely a compendious form for recording & preserving in the memory a number of particular facts, all of which have been previously observed. Generalization is not a process of naming merely; it is also a process of inference. From a certain number of instances which we have been able to observe, we conclude that what holds in those instances, holds in all similar instances, past, present, and future, however numerous they may be: and then, by employing one of the contrivances of language, which enables us to speak of many as if they were one, we record all that we have observed and all that we have inferred, in one concise expression. The immediate and obvious

advantages of this process, consist in the greater facility of remembering one proposition instead of a great number, and the great saving of time and trouble in the communication of knowledge from one person to another, where the results of many observations and inferences, and instructions for making innumerable inferences in unforeseen cases, can be all compressed into one short sentence.

[¶4] When, therefore, we conclude from the deaths which we have heretofore observed, that William the Fourth, like so many of his fellow-men, is mortal; though we may, not improbably, pass through the intermediate generalization, All men are mortal; it is not in the latter half of the process, the descent from All men to William the Fourth, that the inference resides. All the inference that there is in the matter is already made, the moment we have asserted that All men are mortal. All that remains to be performed afterwards, is merely decyphering our own notes.

[¶5] Logicians, and in particular Dr. Whately, have with an uncommon degree of earnestness, set themselves about to establish, that syllogizing, or reasoning from generals to particulars, is not, agreably to the vulgar idea, *a* particular mode of reasoning, but the analysis of *the* mode in which all mankind reason, and must reason, otherwise they can conclude nothing. This doctrine appears to me to be metaphysically incorrect. If, from our experience that John, Thomas, and so many other human beings were mortal, we are intitled to conclude, that all men are so, surely we might, without any logical inconsequence, have concluded at once that William the Fourth is mortal. The mortality of John & Thomas, is, after all, the sole evidence we have for the mortality of William the Fourth. Not one iota is added to the proof by interpolating a general proposition. Seeing, therefore, that the particular cases are all the evidence we can procure, evidence which all the logical modes of dressing it up which were ever hit upon, cannot make greater than it is; since that evidence is sufficient, without generalization, or else is not sufficient, even *with* generalization; I cannot see why we should be forbidden to take the shortest cut from these sufficient premisses to the conclusion; and constrained to travel the "high *priori* road" because logicians tell us that it is the King's highway. I cannot perceive why it should be impossible to journey from one place to another, unless we "march up a hill, and then march down again." It may be the safest road, and the most convenient, and there may be a good resting place on the top of the hill from whence we can see far around us: but supposing we wish only to arrive at our journey's end, our taking that particular road is perfectly *optional*. It is altogether a question of time, troubles, and danger. The syllogistic logic, in short, *is*, precisely what Dr. Whately says it is *not*. It is *an* art of reasoning, and, as we shall presently shew, very frequently the *best*. But it is not *the* art of reasoning.

[¶6] Not only *may* we reason at once, from particulars to particulars, without passing through generals, but we very frequently *do* so reason. All our earliest inferences are from particulars to particulars. From the very first dawn of intelligence we draw inferences; but we live long before we learn the use of signs, particularly those which compose general language.

The child, who, having once burnt his fingers, avoids to thrust them again into the fire, has reasoned or inferred, though he has not thought of the general maxim, that fire burns. He knows from memory that he has formerly been burnt, and on this evidence he fully believes, that if he put his finger into the flame of the candle on the table near him, he will be burnt again. He believes this in each particular case as it occurs; but he is never thinking of any other case than the

one before him. He is not generalizing; he is inferring a particular from particulars.

It is in this way that brutes reason. There is little, if any, ground, for ascribing to any of the lower animals the use of conventional signs. But an animal profits by experience, and avoids what he has observed to cause him pain, in the same manner, though not always with the same skill, as a human creature. Not only the burnt child, but the burnt dog, dreads the fire.

[¶10] Even the philosopher, who is accustomed to state the result of his experience in the form of general propositions, needs not always revert to those generalizations in order to apply his experience to a new case. Dugald Stewart is the author of this remark, though he most unnecessarily restricted its application to the narrow case of mathematical axioms. He observes, that when in Euclid's Elements it is inferred that AB is equal to CD because both of them are equal to EF, the most uncultivated understanding, would, without hesitation, assent to the inference as soon as the propositions were understood, without having ever heard of the axiom, "Things which are equal to the same thing are equal to one another." But here, as in many other instances which might be pointed out, this thoughtful and elegant writer has perceived an important truth only by halves, and his speculations suggest far more than he himself saw. The use which he makes of the above observation is to establish that axioms are not the foundations or first principles of geometry; are not analogous to the laws of motion and of the composition of forces in mechanics, the equal mobility of fluids in hydrostatics, the laws of the reflection and refraction of light in optics, and similar propositions, from which all the other truths of those and other Sciences may be synthetically deduced; but are merely necessary assumptions, self-evident indeed, and the denial of which would annihilate all demonstration, but which are themselves barren, and bring forth no corollaries or derivative truths, either in the way of demonstration or in any other way whatever. That this attempt to distinguish axioms from any other general truths is ineffectual, & indeed, in its own nature self-contradictory I shall hereafter give my reasons for maintaining. I mention it here only as an indication how little guidance Stewart derived from a light, which, if he had continued to keep it in view, would have afforded him a clearer insight than had been possessed by any philosopher before him, into the theory of ratiocination. Finding, in the case of geometrical axioms, that general names had not in them any mysterious virtue, whereby a philosopher is enabled, with them as his talisman, to conjure new truths out of the abyss of darkness; and not seeing that this was equally true of any other generalization, he contended that axioms were in their nature barren of consequences, and that the really pregnant truths, the genuine first principles of geometry, were the definitions. That the definition of a circle, for instance, is to the properties of the circle, what the laws of equilibrium and of the pressure of the atmosphere are to the rise of the mercury in the Torricellian tube. Yet all that he had asserted respecting the function which the axioms perform in the demonstrations of geometry, holds equally true of the definitions. Every demonstration in Euclid might be carried on without them. That this is the case must be obvious to every one, who reflects on the process of proving a proposition by means of a diagram. What, in fact, is the assumption from which Euclid starts to demonstrate by the aid of a diagram any of the properties of the circle? Not, that in all circles the radii are equal; but only, that they are so in the circle ABC. From this, which is not a general but an individual or singular proposition, combining it with other propositions of a

similar kind, some of which, *when generalised*, are called definitions, & others axioms, we prove, that a certain conclusion is true, not of all circles, but of the particular circle ABC; or at least would be so, if the facts precisely accorded with our assumption. The enunciation, as it is called, i.e. the general theorem which stands at the head of one of Euclid's demonstrations, is not the proposition which he in fact demonstrates; nor does he demonstrate any general proposition whatever. He merely demonstrates one individual instance, by a process of reasoning, which, when we duly consider its nature, we perceive might be exactly copied in any other instance among an indefinite number: and we then, by the contrivance of general terms, assert all this indefinite number of truths at once. By dropping the use of diagrams, and substituting in the demonstrations, general phrases for the large letters of the alphabet, we might demonstrate all the cases by one operation. To do this, we must of course express our premises, be they called definitions or axioms, in language equally extensive. But this is merely saying, that if we can prove an individual conclusion by assuming an individual fact, in whatever case we are entitled to make an exactly similar assumption, we may draw an exactly similar conclusion. The definition is a sort of notice to ourselves and others, what assumptions we think we are entitled to make. The general propositions, (whether definitions, axioms, or laws of nature) which we lay down at the beginning of our reasonings, are merely abridged statements, in a species of short hand, of the particular facts, which as occasion arises, we either think we may proceed upon as *proved*, or intend to *assume*. In any one demonstration, it is enough if we make, for one particular case, the assumption which in the statement of the definition or law, we announce that we intend to make in all cases which may arise. The definition of the circle, therefore, is, to one of Euclid's demonstrations, exactly what, according to Stewart, the axioms are: that is to say, the demonstration does not *depend* upon it, but yet, if we deny it, the demonstration fails. The reason of which is obvious. The demonstration rests, not upon the general assumption, but upon an assumption confined to the particular case. But, if once we deny the general proposition, we have no right to assume the particular one which is included in it, for it is not pretended that there is more ground for the assertion in that case than in any other: if there were, it could not have been without a logical impropriety selected as a specimen of the whole class of cases included in the enunciation of the theorem.

[¶11] Both the definitions and axioms, and the enunciations of the theorems, are stated in general terms, *memoriæ causâ*, because they can be more easily carried in our recollection than diagrams and demonstrations, and for other reasons which we shall hereafter state. But that an unpractised learner, even in making use of one theorem to demonstrate another, reasons rather from particular to particular, than from the general theorem, is manifest from the difficulty he finds in applying a theorem to a case in which the configuration of the diagram is extremely unlike that of the original one by which the theorem was demonstrated:—a difficulty which long practise can alone remove, and *that* chiefly by rendering him familiar with all possible configurations compatible with the conditions of the hypothesis.

[§4]

[¶1] From the considerations which we have now educed, it may be considered as fully made out that all inference is from particulars to particulars: that general

propositions are merely registers of such inferences already made, or short formulæ for making more; and that Syllogism, which necessarily proceeds from general propositions, is not a process of inference; the inference being made in laying down the major premiss, and being, therefore, already completed before the syllogism begins. It remains to be shewn, since the syllogism is not a process of inference, or reasoning, what it really is.

[¶2] There is no difficulty in solving this question. I have mentioned that the syllogism, in the ordinary course of our reasoning, is only the latter half of the process of travelling from premisses to a conclusion. There are, however, two peculiar cases in which it is the whole process, and by examining what is its character in those cases, we shall discern that which really belongs to it in all others.

In the ordinary course of acquiring knowledge, it begins as already mentioned, in particulars, because particulars only are capable of being subjected to *observation*. But our knowledge may, in certain cases, be conceived to come to us from other sources than observation. It may be *revealed* to us by a superior being; and thus communicated, may as easily be conceived to come to us in the form of general propositions as of individual ones: indeed, much more easily. Or the generalization may not be, in the ordinary sense, an *assertion*, but a *command*: a *law*, not in the philosophical, but the moral and political sense of the term: an expression of the desire of a superior that we, or any number of other persons, shall conform our conduct to certain general instructions. So far as this asserts a fact, namely, a volition of the legislator, it is not a general proposition at all; the fact asserted in it is an individual fact. But the description contained in it, of the conduct which it is the will of the legislator that his subjects should observe, is general. The proposition asserts, not that all men *are* anything, but that all men *shall* do something.

[¶3] In both these cases, that of a truth revealed to us in general terms, and that of a command intimated to us in the like manner, we arrive at the generalities first, and the particulars have the appearance of being *deduced* from them; by a process which correctly resolves itself into a series of syllogisms. The real nature, however, of this process of deduction, is sufficiently evident. It is a search for truth, no doubt, but through the medium of an inquiry into the meaning of a form of words. The problem is, whether the Being, who revealed to us the general principle, intended to include this case in it; or whether the legislator intended his command to apply to the present case among others, or not. This is a question only of language and classification. It relates entirely to the meaning of a certain form of discourse. The whole operation is not a process of *inference*, but a process of *interpretation*.

[¶4] This last expression appears to me very aptly to characterise the functions of the syllogism. It is a process of *interpretation*, simply. When we argue thus

All men are Mortal
But
William the Fourth is a man
Therefore
William the Fourth is mortal

there is no inference in the case, but merely a more explicit statement, of part of what was asserted in the major premiss. "All men are mortal" was equivalent to, William the Fourth, and Julius Cæsar, and George Washington, & Tom, Dick, &

Harry, &c. &c. are mortal. Of this voluminous predication, or rather series of predications, we take as much as we want, and leave the rest; and that is called syllogizing. The major premiss is like an algebraical formula with *a*, *b*, *c*, *m*, and *n*; in the conclusion we substitute particular numbers, as 16, 20, 50, 2 and 3, for those letters: but this is not inferring a new truth, for we had the same truth before, wrapped up, along with a great number of others, in a set of hieroglyphics. We decypher these as we find occasion, & put such of the truths they contain, as we happen to want, into more familiar language, so as to be more readily available for our purposes. Syllogizing, therefore, is decyphering: it is, once more, a process, not of inference, but interpretation.

[§5]

[¶1] Having, as it seems to me, sufficiently convicted of error, those who imagine that the syllogism is a correct analysis of any process of reasoning or inference; and, having established that there is but one legitimate process of reasoning or inference, namely, reasoning from particulars to particulars, properly called induction; I yet must enter a protest, quite as strong as that of any logician, against the doctrine that the syllogistic art is of no use in reasoning. Syllogizing is not reasoning: induction only is reasoning; but the syllogism is useful in reasoning, as a test of induction itself.

[*]Hereafter, in treating of induction, it will behove us to inquire, in what cases it is allowable to infer particulars from particulars, by what tokens we are able to judge whether an induction is legitimate. For the present, we are only prepared to say, that the problem is very difficult; that the sufficiency of the proof is matter of very nice and delicate discrimination; and that there is scarcely any person whose conclusions do not very frequently outstrip the evidence, or fall short of it. Here is situated the great stumbling-block of philosophy; and any contrivance which can contribute in any the slightest degree to help us over it, is proportionally precious. Now, the syllogism is a contrivance of this sort.

[¶2] Whenever, from an induction of particular cases, we can legitimately draw any inference, our inference may legitimately be a general one. If, from observation and experiment, we can conclude to one new case, we may to an indefinite number. If that which has held in our past experience must therefore hold in time to come, it will not hold in one individual case only, but in all cases of a given discription. Every induction, therefore, which suffices to prove one fact, proves a multitude of facts: the experience which justifies a single prediction, must be sufficient to bear out a general rule. Now this general rule it is extremely advantageous to state fully out, in its broadest generality, and so to place before our minds in its entire extent the whole of what our evidence must prove if it proves anything.

[¶3] The advantage of this as respects the correctness of the induction, is twofold. First, the general principle presents a larger object to the imagination. A process of thought which leads to a comprehensive truth, is felt as more important than one which terminates only in an insulated fact, and the mind is unconsciously led to bestow greater attention upon the process, & to weigh more carefully the sufficiency of the experience. The other advantage is still more important. In reasoning to a particular case, which by the very supposition we

[**The following paragraph disappeared in the rewriting.*]

are imperfectly acquainted with (or else it would not be a subject of investigation) —and in which, very probably, either our imagination or our wishes may be biassed one way, there is the most serious danger of our admitting insufficient evidence as sufficient. But if we place before ourselves an entire *class* of facts—the whole contents of a general proposition,—the whole of which are legitimate deductions from our premises, if that one particular conclusion is so,—there is a probability that if the premises are insufficient, this general inference will comprise within it some fact or facts, the opposite of which we already know to be true. We thus multiply to the utmost the chances that if there is an error in our reasoning, we shall discover it by a *reductio ad impossibile*.

[¶4] Thus, if during the reign of Marcus Aurelius, a subject of the Roman Empire, under the bias naturally given to the imagination and expectations by the lives and characters of the Antonines, had been disposed to conclude that Commodus also would be a virtuous man; if he stopped there, it is possible that he might only have been undeceived by experience. But if he reflected that he could not be justified in drawing this inference, unless, from the same premisses, he was also warranted in reasoning upwards, to the general proposition that All despots are virtuous men; (or some other generalization more or less extensive); he would immediately have thought of Nero, Domitian, and many other instances, which, by proving the falsity of the proposition as a general maxim, proved that it could not legitimately follow from true premisses; and that consequently those premisses would no better support the particular conclusion in favour of the virtue of Commodus, since the conclusion rests on no better foundation in that case than in any other.

[¶5] The advantage, in judging of any controverted inference, of referring to a *parallel case*, is universally acknowledged. Now, by ascending to the general proposition, we call in to our assistance not one parallel case merely, but all possible parallel cases at once.

[¶6] Now, therefore, if we are arguing from a certain number of known cases, to another case supposed to be analogous; we may transmute our argument into the form of an induction from those known cases up to a general proposition, and a subsequent reasoning downwards from the general proposition to the known case. The latter part of the process will thus be resolved into a series of syllogisms, the majors of which are broad general propositions, every one of which must be true, if our argument is conclusive. If any one fact therefore, fairly coming within one of these general propositions, is known or suspected to be other than the proposition makes it, this mode of stating the argument causes us either to know or to suspect that our reasoning will not hold. And in proportion to the greater chance of our detecting its fallacy, will be the encreased reliance we are entitled to place in it if no fallacy appear.

[¶7] The principles and rules of the syllogism are therefore highly useful. Not because they are the principles and rules according to which our reasonings are necessarily, or even usually, made: but because they furnish us with a form into which those reasonings may always be thrown, and in which, if they are incorrect, their incorrectness will more readily appear. The syllogism is not a form in which we *must* reason, but it is one in which we *may* reason, and into which it is advantageous to throw our reasoning, when there is any doubt of its validity. Not indeed the whole of the process of reasoning (except in those cases already noticed, where the entire process resolves itself into interpretation); but the latter part of it. An induction from particulars to generals, followed by a syllogistic

process from those generals to other particulars, is a form in which we may always state our reasoning, if we please; though when the case is familiar and little complicated, and where no doubt exists, we safely may, and do reason at once from the known particular cases to unknown ones.

[¶8] As respects one single argument, the above are the uses of the syllogism. As respects the general course of our intellectual operations, this mode of stating an argument has the further advantage, that the induction may be made once for all: one single careful examination of the particular cases may suffice, and the result may be registered in the form of a general proposition, which is committed to memory, and from which, afterwards, we have only to syllogize. The particulars of our experiments may then be dismissed from the memory, in which it would be impossible to retain so great a number of details; while all the knowledge which those details were capable of affording, and which would otherwise be lost as soon as the experiments themselves were forgotten, is retained in a commodious and immediately available shape by means of general language.

[¶9] Against this immense advantage is to be set the countervailing disadvantage, [*]that inferences originally made on insufficient evidence, became consecrated & as it were hardened into the form of general maxims, and the mind cleaves to them from habit, long after it has outgrown any liability to be misled by such fallacious appearances if they were now for the first time presented to it. This strengthening of its powers does not avail for correcting the original inductions, because the mind has no longer present to it the particulars of the experiments from which that induction was made.

[¶10[†]] Upon the above great advantage of general propositions, and this its inevitable alloy, many opportunities will present themselves for further discussion.[‡] I have only now to remark that so far as the syllogism is concerned in this function of general language, it is as a process of interpretation, merely. The knowledge is already acquired, and recorded in a general expression, of which it only remains to decypher the sense.

We have now shown, that the distinction between Induction & Reasoning, as commonly understood, has no real foundation. There are not two modes of arriving at truth, one proceeding upwards from particulars to generals, another downwards from generals to particulars. All knowledge is knowledge of particulars; all inference is from particulars to particulars. General propositions are mere signs for registering indefinite multitudes of particulars; and what is called ratiocination, or reasoning from generals to particulars, is merely decyphering those signs.

But, although all argumentation is from particulars to particulars, all argumentation may be thrown into the circuitous form of a double process, from particulars to generals, & from those generals to other particulars. And it is highly advisable, it is even indispensable to correct reasoning, when the subject is obscure or complicated, thus to interpolate a general proposition between the real premises and the real conclusion. For all particulars which will prove any

[**Gathering* M *(formerly* I*) begins here. This gathering, the last in Scribe A's hand, is one folio short, and the final eleven-and-one-half folios are blank. The final sentence, in JSM's hand, is a revision probably resulting from the adding of Gatherings* N-P; *cf.* p. 1078n.]

[†*Conflation and rewriting of the next four paragraphs resulted in* ¶10.]

[‡*The preceding three words are interlined for this cancelled passage:* of hereafter dissenting [*sic*] either in the present work or elsewhere.]

conclusion at all, will prove a general conclusion. Whatever we have ground to believe of any one individual, on mere inference, without specific experience, we have equal ground to believe of all individuals whatever, which agree with that individual in the circumstances upon which the inference is founded. We are enabled therefore to judge more correctly whether we can conclude to the individual case, by trying [?] whether in concluding to the entire class of cases, we are led into anything which is in contradiction to our previous knowledge.

Generalization, in short, is not a necessary part of reasoning, but it is a highly useful operation for verifying the correctness of reasoning.

[§6]

[¶1] As much has now been said as seems necessary, not only for proving but for duly illustrating the above propositions. The theory, however, of ratiocination is not yet complete. The syllogism consists of a conclusion and *two* premisses, the major & the minor. We have analysed the major, and have shewn that it is no part of the process of reasoning at all. We have also shewn what it really is, and what are its offices and uses in philosophy. But there is also the minor. What is *its* office? Is it as unnecessary a part of the process as the major? Should we be able to reason without it? And is it only useful in as much as it is a part of that syllogistic dress into which it is advantageous to put an argument, in order to be more certain of its validity?

[¶2] A philosopher, to whom mental science owes much, Dr. Thomas Brown, has answered this question in a manner which demands our notice. The minor premiss, according to him, is not merely a *part* of the process of argumentation, but the *whole*. A is B therefore A is C is a formula which he considers to represent the whole operation of the human intellect in reasoning. The major premiss he rejects as we do, because it assumes by implication the truth of the conclusion which it affects to prove: but the error of the Aristotelian logicians he conceives to lie in not resting satisfied with the minor premiss & the conclusion, as a full and satisfactory analysis of the reasoning process. "All men are animals, Socrates is a man, therefore Socrates is an animal," is, according to him mere trifling. "Socrates is a man, therefore Socrates is an animal," is all that really passes through the mind.

[*]There is no doubt that in the particular case which we have selected as an example, Dr. Brown's observation would be just. "Socrates is a man, therefore Socrates is an animal," requires no third proposition to render the inference legitimate. If Socrates is a man, we may know without further inquiry that he is an animal: but why? Because we know it already. We have asserted it in the very words we used. The meaning of the word "animal" is involved in the meaning of the word "man." *Man* connotes all that *animal* connotes, & more. There is, therefore, no inference in this case at all, but a mere reassertion of part of the antecedent. The proposition, which must be supplied if the argument is to be stated syllogistically, viz: "All men are animals," is an *essential* proposition, and all *essential* propositions are, as we have long since shewn, merely identical. Dr. Brown's theory of reasoning, though given by him as a substitute for the syllogistic doctrine, is liable to precisely the same objection which lies against that doctrine itself, considered as an analysis of reasoning; i.e. it is quite a correct

[**The remainder of this section (to* p. 1077*) was much rewritten to produce* ¶¶3–5.]

analysis of the operation of the intellect in certain cases, but these unhappily are precisely the cases in which there is *no* reasoning. Such indeed are the cases usually selected by the scholastic logicians, as examples of reasoning. We have formerly commented on the injury which the reputation of the syllogistic art has suffered from this habit of exemplifying its rules by specimens which have only the form of reasoning without the substance; syllogisms in which the major premiss being an essential proposition conveys no information whatever. Were there not evidence to the contrary in his own choice of examples, we might almost have suspected that Dr. Brown, who, though a very penetrating, was a very hasty thinker, and seldom proceeded with due circumspection, had, when he turned his attention to the syllogism, unluckily fallen upon one of these ill-chosen specimens; in which the major premiss really is utterly futile, and the conclusion wholly involved in the minor premiss; and that, overlooking the very peculiar character of the example, he had inferred at once, that what was true of such a syllogism was true of all others. This would only have been one instance among many of that precipitation, which has rendered Dr. Brown fully as remarkable for what he did not see, as for what he saw. In reading his speculations, your wonder is alternately excited at the acuteness which discerns a truth not easily discoverable, and the oscitancy which misses another, lying close to the former, and far more obvious.

If, instead of a syllogism in which the main premiss is an essential proposition, we choose one in which that premiss conveys information of a matter of fact; if, for instance, instead of "All men are animal," the major premiss is this, "All men are mortal," and the remainder of the syllogism, "Socrates is a man, therefore Socrates is mortal" we arrive at far other notions of the reasoning process. For although we may dispense with the major premiss, "All men are mortal," we can only do so by putting in its place, the particular truths from which that generalization was made. The arrangement, when stated fully will stand not thus:—

Socrates is a man
therefore
Socrates is mortal;

but thus;

My father, and his father, and his father's father, and Tom, and Dick and Harry, and so on (to the end of the series of all persons of whose deaths I have direct evidence) were mortal:

(We cannot add, But Socrates is a man, for there would be nothing to connect this with the other premiss, and the two together would not prove anything. The minor premiss must therefore undergo a transformation, and stand as follows:)

But Socrates resembles my father, and his father, and his father's father, and Tom and Dick and Harry (to the end of the enumeration as before):

Therefore
Socrates is mortal.

Here, we have at length a correct statement of the nature of the argumentation, which the syllogistic doctrine rudely expresses thus: "All men are mortal, but Socrates is a man, therefore Socrates is mortal."

The major premiss, "All men are mortal," when divested of the *petitio principii*, and cut down to as much as is really known when the argumentation begins, is reduced to an assertion of the mortality of certain definite individuals.

The minor premiss, "Socrates is a man," is equivalent to an assertion, that

Socrates resembles those definite individuals; namely, in possessing certain attributes, which are involved in the signification of the word man. It is true, the proposition, "Socrates is a man," in itself only asserts that Socrates possesses those attributes; his resemblance to those other individuals is only asserted by implication; and for anything that appears on the face of the proposition, they may never have existed. But from the mere possession of those attributes by Socrates, we cannot conclude anything as to his mortality. The ground on which we infer his mortality is his resemblance to other individuals, whose mortality is known to us by experience. This resemblance happens to consist in those particular attributes which we predicate of him when we call him a man. But the attributes themselves would not bear us out in any conclusion, if no other being possessed them, or possessed attributes in any way resembling them. All reasoning is from a *parallel case*, or from cases more or less *analogous*, never from the very case itself.* We may learn any number of properties of a thing, by intuition or consciousness, but we never can infer one property from another, except so far as that other constitutes a resemblance to some other thing, which possesses both the properties united. All reasoning, all inference, is founded upon *resemblance*.

Dr. Brown must have know all which we have now stated: but it probably never presented itself to his mind in this precise shape; other wise he could not have committed the mistake of resolving an argument into nothing but the minor premiss and the conclusion. For he would have seen that what is directly asserted in the minor premiss, not only does not prove the conclusion, but does not go any part of the way towards proving it. What really contributes to the proof is a proposition, which is not the minor premiss itself, but which must be true if that premiss is true; viz: that the individual which is the subject of the minor premiss resembles certain other definite individuals, of whom that which we are attempting to prove, is already known to be true.

[§7*]

[¶1] Whether the resemblance is such, in kind & in degree, as is necessary to warrant us in concluding that an object which resembles the others thus far, must resemble them further, is a question the difficulties of which remain untouched by anything we have yet said. This is the great problem of Induction; and it is in the chapter on Induction, that we shall enquire what can be done to facilitate its solution. What is necessary at present is, that it should be distinctly seen, that all reasoning may be reduced to the following formula: Certain individuals have certain attributes, A particular individual resembles those individuals in some other attributes, Therefore it possesses these also. And these three propositions, which are necessarily found in every argument, whether it be called Induction or Demonstration, correspond, the first to the major, the second to the minor, and the third to the conclusion of the Syllogism.

*An acute sense of this important truth was manifested by Bacon, when he blamed the enquirers, "qui naturam rei in ipsa re perscrutantur." [*Novum Organum*, vol. I, p. 180.] Those thinkers and practitioners who consider themselves as Baconians *par excellence*, have generally profitted but little by this warning. What is called *practice* and *experience*, as distinguished from *theory*, is generally a confident pretence of undersanding the nature of a thing by an investigation *in ipsa re*, not by *comparing* it with any other thing.

[**The material in this section was conflated and revised in the light of* Book III.]

If it be said, that in the Syllogism, the correctness or incorrectness of the process, appears from the form of the expression, and that the mode of stating it which we propose to substitute, affords no such test of its having been properly performed, I answer, it affords it just as much as the Syllogism. Neither affords any test of the sufficiency of the induction, because that is complete before the syllogism begins. To imagine that any form or expression can help us to that, would be like relying on magic. But when the induction has been performed, and the result recorded in general terms, the rules of the syllogism are of great use in the interpretation of the general proposition; for if they are strictly observed, they ensure that what is inferred in any particular case shall be the same thing which it has previously been concluded that there was ground for inferring in a whole class of cases of which that is one.

In decyphering, therefore, the records of a previous induction, the rules of the syllogism are of the greatest value. And it will be seen in a subsequent place, how many of our most insidious errors have their seat in this part of the intellectual process.[*]

[**The final sentence was added in JSM's hand to replace the following passage, deleted from the conclusion of the preceding sentence:* ; and in that, I do not propose that they should be superseded]

OF TRAINS OF REASONING[*]

[Chapter iv: Of Trains of Reasoning, and Deductive Sciences]

[§1]

[¶1] From our analysis of the syllogism it has appeared that the minor premiss always affirms a resemblance between a new case and some cases previously known: while the major premiss states something which has been found to be true of those old cases, and which by induction we consider ourselves at liberty to infer to be true of any other case resembling them in certain given particulars.

[¶2] If all ratiocinations resembled, as to the minor premiss, the example which we chiefly employed in the last chapter; if the resemblance which the minor premiss asserts, were obvious to the sense, as in the proposition "Socrates is a man," or were at once ascertainable by direct observation; there would be no necessity for trains of reasoning, and Deductive or Ratiocinative Sciences would not exist. Trains of reasoning exist only for the sake of applying an induction founded (as all inductions must be,) upon observed cases, to other cases which are not only unobserved but are not even directly observable.

[§2]

[¶1] Thus, suppose the syllogism to be, All cows ruminate, This which is before us is a cow, therefore This which is before us ruminates; the minor is obvious; the only one of the premisses which requires for its establishment any anterior process of enquiry is the major, and provided the induction of which that premiss is the expression, was correctly performed, the conclusion respecting the animal now present was already drawn before the animal appeared: we have only, as it were, to identify her—to ascertain by reference, that she was included in the inductive inference of which the general proposition "All cows ruminate," is a record. But let the syllogism be the following, "All Arsenic is poisonous," This which is before us is arsenic, therefore This which is before us is poisonous; the minor in this case, may not be obvious at first sight; may be itself known by inference, and not by direct intuition: it may be the conclusion of another syllogism, such as this: All things which produce a precipitate of a certain colour, with a certain chemical test, are arsenic; This which is before us produces such a precipitate, therefore it is arsenic. The ultimate conclusion, This which is before us is poisonous, requires therefore to establish it, a process which to be syllogistically expressed will require two syllogisms; and we have a Train of Reasoning.

[¶2] It is however obvious that in thus adding syllogism to syllogism, we are really adding Induction to Induction. Two inductions must have taken place to render this chain of inference possible: two inductions, founded probably on two distinct sets of individual instances, but which converge in their results so that the instance supposed to be the subject of speculation, comes within the scope of them both. The register of these two inductions is contained in the majors of the two syllogisms. We examined several substances yielding to the supposed test the supposed precipitate, & we found that they possessed the properties connoted by

[**Gathering* N *begins on this folio. Gatherings* N *through* P, *and* N² *are in Scribe C's hand.*]

the word arsenic; they were metallic, volatile, their vapour had a smell of garlic &c. We have examined several (though probably not the same) substances of this metallic, and volatile nature, with vapour smelling of garlic, and we have found them poisonous. The first observation we think we may extend to all substances which yield the precipitate; the second, to all such metallic and volatile substances, and consequently not only to what are seen to be such, but to what are concluded to be such by the prior induction. The substance before us is brought within the one induction by being seen to come within the other: We are still concluding from particulars to particulars; but in this case we conclude from particulars observed to other particulars which are not *seen* to resemble them in the material points, but *inferred* to do so because resembling them in some other points, from which resemblance, it has been concluded from a quite different set of instances, that resemblance in the former points is inferrible.

[¶3] The process necessary for the establishment of the minor premiss is often far more complex than in the foregoing example. Take for a fresh example the following syllogism: The foolish do not prosper long, Napoleon is foolish, therefore he will not prosper long. The major premiss is the record of an induction which may be correct or erroneous, but which can only have been founded upon observation of persons concerning whose foolishness there was no doubt. It has been found or supposed to be found, that they did not prosper long, and it has been deemed that the induction which those instances warrant, is an extension of the same predicate to any and every person who resembles those persons in the one attribute of being foolish. But *does* Napoleon resemble them in that attribute? This may be debated pro and con by countless arguments; and must in any case, be proved by another induction; for we cannot observe his foolishness directly; we never saw him: and every argument to prove it must be in this form, Whoever does so and so is foolish, Napoleon has done so and so, therefore he is foolish. But *has* he done so and so? This minor may require proof: still another induction; as thus: What is asserted by many disinterested witnesses, must be believed to be true, That Napoleon committed this action is asserted by many disinterested witnesses, therefore it must be believed to be true. Here Napoleon being seen to resemble the particular instances which experience presents to us, of persons concerning whom something is asserted by many disinterested witnesses, we infer, *first*, that he is a person concerning whom that "something" is true. The "something" being in this case, his having done a particular act, he is thus brought into resemblance with those persons before observed, who were foolish, and thereupon by a *second* induction, we infer him to be foolish. This brings him into resemblance with the foolish persons, who were observed not to prosper, and thence by a *third* induction, we predict that his prosperity will not continue. In this way we are enabled to reason from the particular foolish people whom we had observed not to prosper, to people whom we did not even know to be foolish when we made the induction; yet if the induction was good, and therefore applicable to all persons whose fortunes we have not observed, but whom we *see* to be foolish, it must be no less applicable to all whom we do not see but infer to be such, provided the induction by which we so infer them be correct. It is still reasoning from particulars to particulars, but we now reason to the new instance from several distinct sets of former instances: to one only of these sets of instances do we directly see it to be similar; but from that similarity we inductively infer that it has the attribute, which constitutes its similarity to the next set, and renders the induction founded upon them, applicable to it likewise.

[§3]

[¶1] It may appear a forced use of language to say that the syllogistic, or ratiocinative process, when carried out to this length of applying an induction to cases which not only were not dreamed of when the induction was made, but if known of at the time, would not necessarily have been known to come within it, is still a process of interpretation merely. The induction that Napoleon will not prosper, from the general proposition No foolish persons prosper, when the fact of his being a foolish person itself needs proof, cannot, it may be said, be justly characterized as a mere decyphering of what is written in the general proposition. But a metaphorical expression ought not to be strained beyond its intended meaning. When we said that reasoning from generals to particulars is mere interpretation of the general propositions, what we meant to affirm was this: That the general proposition is not a step in the reasoning, an intermediate link in the chain of inference between the particulars observed, and the particulars to which we apply the observation: the reasoning (if we had sufficiently capacious memories) could go on without any general propositions; they are mere *formulæ* for inferring particulars from particulars. The essence of all reasoning is, that from observation of certain known particulars, we may draw a similar conclusion with respect to others which are unknown: but if we may with respect to *any* others, we may with respect to *all* others of a certain general description; and in order that we may never fail to draw this conclusion in a new case, whenever it can be drawn correctly, we determine with ourselves once for all, what are the distinguishing marks by which such cases may be recognized. The subsequent process of identifying an object, and seeing whether it has those marks, cannot be called an inference; even when we identify it not by those very marks, but by others which we have ascertained (by another and a similar process) to be marks of those marks. The only *inference* involved in the case, is an inference from the observed particular instances, to the new and unobserved one. In drawing this inference, we conform to a *formula* which we have prescribed to ourselves expressly for our guidance in drawing such inferences, and which formula is an exact record of the judgment we previously formed, as to how we were to know when the inference could be drawn or not. In this sense, what we do when we actually draw it, may be called an interpretation of the record. Often too the formula is all that is left to us of the evidence from which we infer; having forgotten the experiments or observations from which we originally generalized (when our first illustration, that of referring to our own notes, most obviously holds): or perhaps, they were the observations of other people and not ours at all. Still it is those observations that are the original premisses of our argumentation: we have them not before us, but we have before us evidence that we or others once thought them sufficient grounds for an induction, and we have marks to show whether any new case is one of those to which if then known the induction would have been deemed to extend. Those marks we either recognize at once, or by the aid of other marks, which by another former induction we collected to be marks of *them*. These marks of the marks, may, again, be known only through other marks; and thus we may have a train of reasoning of any length, bringing a new case within the scope of the induction warranted by particulars its resemblance to which is only known from its resemblance to other particulars that resemble them.

[¶2] Thus in the speculation concerning Napoleon, the inductive inference

ultimately arrived at was, that he would not prosper: this inference was drawn according to a formula which made foolishness a mark of not prospering; a mark of this mark was, having done a particular action; & a mark of having done that action was, being asserted by many disinterested witnesses to have done it: this mark, Napoleon was seen to possess. Hence he fell within the last induction, and that brought him within all the others—His resemblance to one set of observed particular cases brought him into resemblance with another group, & that with another.

OF DEDUCTIVE SCIENCES[*]

[§4]

[¶1] The considerations which have just been stated, furnish the means of reconciling our doctrine, that all reasoning is induction, with the fact that there are Deductive or Ratiocinative Sciences. It might at first seem that if all reasoning be induction, all the difficulties of reasoning, that is of science, must lie in making the inductions, and in determining whether they be duly made: and that therefore where all the inductions were easy and certain, there could be no science, or no difficulties in science. But it has been seen from the preceding chapter, that even when the inductions are of the simplest and most obvious nature, there may be much difficulty in finding whether the particular case, which forms the subject of enquiry, comes within them; and ample room for ingenuity in so combining various inductions, as by means of one, within which the case obviously falls, to bring it within others, its inclusion in which is not obvious.

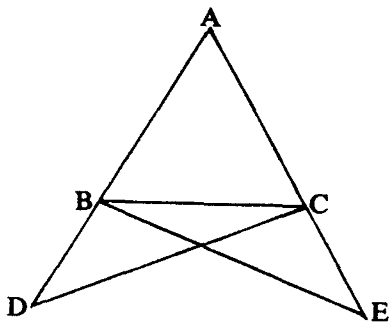
[¶2] Suppose that all the inductions, which are possible in a given science, have been made, or rather formulized into general propositions, by the aid of which we judge to what new cases they are applicable: when a new case arises, which can be at once seen to come within the formula, the induction is applied to that new case, and the business is ended: But new cases are continually arising, which cannot be at once perceived to come within any formula, which would answer the questions we want answered in respect to them. Take an instance from Geometry, the fifth proposition of the first book of Euclid. The enquiry is "Are the angles at the base of an isosceles triangle, equal or unequal?" For inferring equality we have the following formulæ: Things which being applied to one another coincide, are equal. Things which are equal to the same thing, are equal. The sums of equal things are equal. The difference of equal things are equal. For inferring inequality we have the following formulæ: A whole and its part are unequal. The sums of equal things and unequal things are unequal. The differences of unequal things and unequal things are unequal. These are the only formulæ we have. The angles at the base of an isosceles triangle do not obviously come within any of these formulæ. They cannot be seen to have any of the marks either of equality or inequality which the formulæ specify. We are to consider whether they have any properties which in any other formulæ are set down as being marks of these marks. We examine, and find that they have. The formula within which we ultimately succeed in bringing them, is this, "The remainders of equal things are equal." We find that they are remainders of equal things. The difficulty in finding this, arises from the circumstance, that out of the innumerable pairs of angles of which they may be the remainders, we have to imagine and select two, which can either be seen to be equal, or possess some of the marks of equality, specified by the various formulæ. By an exercise of ingenuity, which on the part of the first inventor, deserves to be regarded as considerable, two pairs of angles were hit upon, which, while it could be *seen* that their differences were the two angles at the base, possessed one of the marks of equality, namely, coincidence when applied to one another. Even this coincidence was only proved by a fresh induction: it appeared that unless they coincided, two straight lines would enclose a space: thus though they were not seen to coincide, they were

[**In rewriting, JSM combined this chapter with the preceding one.*]

brought under a formula for coincidence. This again is done by two steps, and requires two formulæ: Angles coincide when the straight lines which form them coincide: Straight lines coincide whose extreme points coincide. (See the demonstration of the fourth proposition on which the demonstration of the fifth is founded.)

[¶10*] The ingenuity which is here exercised is that of figuring in our imagination the two angles at the base of the triangle, as remainders made by cutting out of one pair of angles, another pair of angles, which pairs are severally the corresponding angles of triangles having two sides and the intervening angle equal. It is by this happy contrivance that so many different inductions are brought to bear upon the same particular case. For, this being done, and the figure constructed, the induction, Two straight lines cannot enclose a space (*aliis verbis* Two straight lines of which the extremes can be applied to each other, will coincide) is seen to be applicable to the bases of the two pairs of triangles; this brings the angles at those bases within a second induction, Angles whose sides coincide, coincide; and consequently within a third induction, Things which coincide, are equal; and the equality of these angles, brings their remainders within a fourth induction, The remainders of equals are equal. Another induction is involved, The sums of equals are equals: it is by this we prove the equality of the sides of the triangles: There are in all six formulæ.

[¶3] We may state it thus. AB, AC, the sides of the triangle, being prolonged to equal distances and the extremities joined, we have



[¶4] 1st Formula. The sums of equals are equal.	AD and AE by the supposition come within this.
[¶5] 2nd Formula. Equal straight lines if applied to one another will coincide.	AE, AD, have been brought within this formula by the last induction: AC and AB, are within it by the supposition. AE, therefore will coincide with AD, and AB with AC; of which assertion it is but a part to say that E will coincide with D, and B with C.
[¶6] 3rd Formula. Straight lines between the same extreme points will coincide.	BE and DC, have been brought within this formula by the last induction. They will therefore coincide.

[**In the rewriting this paragraph was combined with that indicated as* ¶10, p. 1085 *below.*]

[¶7] 4th Formula. Angles whose sides coincide, coincide.	The angles ABE and ACD are brought within this formula by the two previous inductions, which shewed that BE, DC, and that AE, AD, coincide.
[¶8] 5th Formula. Things which coincide, are equal.	The angles ABE, ACD, were brought within this formula by the last induction.

Half the proof is therefore accomplished.

It is easy by similar means to accomplish the other half; that is, to bring the angles EBC, DCB also within the fourth formula: we have then

[¶9] 6th Formula. The differences of equals are equal.	The angles ABC, ACB, being the differences of ABE, ACD, and EBC, DCB, are brought within this formula by the whole of the previous process.

[¶10] There is ample scope for scientific dexterity and ingenuity in so combining a few simple inductions, as to bring within each of them, great numbers of cases, which are not obviously included in it: and the processes necessary for bringing the inductions together, may be very long, numerous and complicated, when the inductions themselves are very easy and simple. This is the case in mathematics. All the inductions involved in all Geometry are those simple ones the formulæ of which are the Axioms and a few of the so-called Definitions. All the rest of Geometry is made up of the processes employed for bringing unforeseen cases within the inductions—or (in syllogistic language) for proving the minors necessary to complete the syllogisms. But all these processes are Inductions; at each step, the case under examination is taken into the formula of some one or other of the Inductions which the Axioms and Definitions are the record of. The Inductions being of the most familiar kind and so few in number, and the connecting of several of them together which constitutes Deductions, or Trains of Reasoning, forming the bulk of the science, and its only difficult or intricate part; Geometry is a Deductive Science.

[§5]

[¶1] When we treat of Induction, it will be seen that there are strong reasons for giving to every science as much of the character of a Deductive Science as possible; that is, for endeavouring to construct the science from as few and as simple Inductions as possible, and (by even the most complex combinations) to make these suffice for proving even those truths with respect to complex cases, which could have been ascertained by specific observation of, and Induction from, cases obviously similar. This, for instance, is done when an experimental science is rendered mathematical. It was done when astronomy was brought by Newton within the laws of mechanics. To do this is the great triumph of the Investigation of Nature: as will be fully shewn and illustrated hereafter. In proportion as this is done, Sciences tend to become more and more Deductive. But they are not the less Inductive; every step in the Deduction is an Induction and nothing else. The opposition is not between Deductive and Inductive, but between Deductive and Experimental. A science is experimental in proportion as every new case, presenting any peculiar features, requires a new set of observations, or experiments, a fresh Induction: it is Deductive, in proportion as it is

able to draw conclusions as to cases of a new kind, by processes for bringing those cases under old Inductions: by finding that cases not having the requisite marks, have, however, marks of those marks.

[¶2] We can now, therefore, see what is the generic difference between sciences which can be made Deductive, and sciences which must as yet remain Experimental. The difference consists in our having been able, or not yet able, to discover marks of marks. If, by our various Inductions, we have found that a quality which we will term *a*, is a mark which indicates and from which we may infer, a quality *b*, but have not found that *b* is a mark of anything, except, perhaps reciprocally of *a*; and our next induction is perfectly distinct, and gives us *c* as a mark of *d*, but we have no induction which establishes that *c* or *d* accompany and may be inferred from *a* or *b*; we have two scientific generalizations, perfectly distinct and independent of one another, as for instance that acids redden vegetable blues, and that alkalies turn them green: from neither of which propositions could we infer the other, and a science so far as it is composed of such propositions is purely experimental. Chemistry in the present state of our knowledge is principally of this character: its propositions are of this sort, *a* is a mark of *b*, *c* is a mark of *d*, *e* is a mark of *f* and so on.* There are other sciences again of which the propositions are of this kind, *a* is a mark of *b*, *b* is a mark of *c*, *c* is a mark of *d*, *d* is a mark of *e*, &c. In these sciences we can mount the ladder from *a* to *e* by a process of ratiocination, and conclude that *a* is a mark of *e*, although apparently quite unlike anything which was visible in the instances upon which the first of the inductions in which *e* figures in the predicate was founded: those being instances in which *d* was perceptible, while it is not perceptible but only inferrible in the case to which that induction is now extended. Or varying the metaphor, we may say that we get from *a* to *e* underground; the marks *b*, *c*, *d* which indicate the route must all of them be possessed *somewhere* by the object concerning which we are enquiring, but they are all of them below the surface: *a* is the only mark that is visible.

[*]Such as now described has always been the character of the processes of science in Mathematics: it has now become so in Mechanics and Astronomy, and is becoming more and more so in politics and the philosophy of the mind. Even in chemistry the great generalization of Dalton, called the atomic theory, (or the doctrine of chemical equivalents), is a commencement of a similar transformation.[†]

[§6]

[¶1] We can now understand how an experimental science may transform itself into a Deductive by the mere progress of experiment. In an experimental science the inductions lie detached; *a* a mark of *b*, *c* a mark of *d*, *e* a mark of *f*, and so on: a new set of instances and a consequent new induction, may at any time bridge over the gap between two of these unconnected arches: *b* may be

*Most commonly in experimental sciences, groups of qualities are mutually marks of one another: For complete accuracy the expressions in the text should be altered to some such as the following: *a*, *b*, *c*, marks of one another: *d*, *e*, *f*, marks of one another: and so on.

[**In the rewriting part of this paragraph was incorporated into* §6, ¶2.]

[†*In this sentence* erroneously *is cancelled before* called, *and* or *is interlined to replace the cancelled words* more properly]

discovered to be a mark of *c*, or of *e*. Or what is more frequently the case, some grand comprehensive induction raises an arch high in the air which bridges over hosts of them at once: *b*, *d*, *f* and the rest are all discovered to be marks of some one thing, or of things between which a connexion has already been traced. As when Newton discovered that all the motions, regular or seemingly irregular, of the bodies of the solar system (each of which motions had been discovered by a separate act of generalization and from its own separate marks) were all of them marks of moving round a common centre, with a centripetal force varying inversely as the square of the distance from that centre. This is the greatest instance which has yet happened of the transformation, at one stroke, of a science which was still to a great degree experimental, into a deductive science.

[¶2] A transformation of the same sort, on a small scale, would be operated in chemistry so far as regards the two propositions cited above, viz. Acids redden vegetable blues, Alkalies make them green; if we should conceive it to be discovered (which may easily be imagined possible) that the blue colour in vegetable substances, is a mark of some hitherto undetected elementary substance; and that this substance makes with all acids a red compound, with all alkalies a green one. Here we require a great number of new sets of instances, and consequent new sets of inductions, and when we have got them, instead of connecting all the truths of a science, we only connect the two solitary generalizations mentioned above. This however is so much gain; but has little tendency to convert an experimental into a deductive science, because the new courses of observation and experiment which thus enable us to connect a few general truths together, generally call into existence a still greater number of unconnected new ones. Hence chemistry, although such extensions and simplications of its generalizations are continually taking place, still remains essentially an experimental science; and is likely so to remain, unless some comprehensive Induction shall be hereafter arrived at, which like Newton's shall connect a vast number of the smaller known Inductions together, and change at once the whole method of the Science.

OF DEMONSTRATION; AND NECESSARY TRUTHS[*]

[Chapter v: Of Demonstration, and Necessary Truths]

[§1]

[¶1] If, as has been laid down in the preceding chapters, the foundation of all Sciences, even Deductive or Demonstrative Sciences, is Induction; if every step in the ratiocinations of Geometry is a process of Induction, and a train of reasoning is but bringing many Inductions to bear on the same subject of enquiry, and drawing the case within one Induction by means of another; wherein lies the peculiar certainty always ascribed to the Sciences which are entirely or almost entirely Deductive? Why are they called the Exact Sciences? Why are mathematical certainty, and the evidence of demonstration, common phrases to express the very highest degree of assurance attainable by reason? Why is mathematics, by most philosophers, set down as independent of experience and observation, and characterized as a System of Necessary Truth?

[¶2] The answer is, that this superior certainty in the truths of mathematics, this character of necessity which is ascribed to them, is an illusion; in order to sustain which it is necessary to suppose, that those truths relate to and express the properties of purely imaginary objects. It is acknowledged that the conclusions of Geometry are deduced from the so-called Definitions. In our chapter on Definition we showed (what seems obvious as soon as stated) that from a Definition as such, no proposition, unless it be a proposition concerning the meaning of a word, can ever follow: and that what apparently follows from a Definition, really follows from an implied assumption, that there exists a real thing, conformable to the Definition. This assumption, in the case of the definitions of Geometry, is false: there exist no real things, exactly conformable to the Definitions. There exist no points without magnitude, no lines without breadth, or perfectly straight, no circles with all their radii exactly equal, nor squares with all their angles perfectly right. This being obvious, and acknowledged, it is customary to say, by way of saving the credit of the supposed Systems of Necessary Truth, that the points, lines, circles, and squares which are the subject of Geometry, exist in our conceptions merely, and are a part of our minds: which minds by working on their own materials, construct an *a priori* science, having nothing whatever to do with outward experience. But this is just as far from the truth. The points, lines, circles, and squares, which anyone has in his mind, are simply copies of the points, lines, circles and squares which he has known in his experience; and it is astonishing that this should be questioned after Bishop Berkeley's triumphant refutation of the theory of abstract ideas. All our ideas of objects, are of individual objects: We can reason about a line as if it had no breadth, but we cannot conceive a line without breadth; we can form no picture in our imagination of such a line: all the lines which we have in our minds are lines possessing breadth. If any one doubts this we may safely refer him to his own experience. No one, probably, who ever fancied that he could conceive what is called a mathematical line, fancied it from the evidence of his own consciousness, but solely because he could not reconcile the contrary supposition with the

[**Gathering* O *begins on this folio.*]

reality of mathematics as a science. How it may be reconciled therewith, I think the sequel will shew.

[¶3] Since then neither in nature nor in the human mind do there exist any objects exactly corresponding to the definitions of Geometry; while yet, Geometry cannot be supposed to be conversant about objects purely imaginary; nothing remains but to consider geometry as conversant with such lines, angles, and figures as really exist; and the definitions as they are called, must be regarded as our first and most obvious generalizations concerning those natural objects. These generalizations are correct, *as* generalizations; that is, each of the general propositions is true of the whole class referred to in it, as far as it is true of any one individual in the class; but it is not exactly true of any individual; it is only nearly true: so nearly that no error of any importance in practice will be incurred by feigning it to be exactly true. When we have occasion to extend these inductions or their consequences to objects varying in any appreciable degree from those which furnished the materials of our generalization—to lines of appreciable breadth or thickness, parallels which are not exactly parallel, and the like, we correct our conclusions by combining with them a fresh set of propositions relating to the property which was overlooked. [¶4] The difference however, in exactness between these elementary generalizations in geometry, and the elementary generalizations of any other physical science, is fictitious. The assertions on which the reasonings of the science are founded, do not, any more than in other sciences, exactly correspond with the fact; but we *suppose* that they do, for the sake of seeing what consequences will follow from the supposition. The science is built upon, its conclusions are deduced from, *hypotheses*.

[¶5] When, therefore, it is affirmed that the conclusions of geometry are *necessary* truths; it appears, that all the necessity which can be ascribed to them, is only that they *necessarily follow* from the suppositions from which they are deduced. These suppositions not being necessary, nor even true, the conclusions deduced from them are only necessary in the sense of necessarily following from the suppositions; which is only saying that for the suppositions to be true and the conclusions false would involve a contradiction. I conceive that this is the only correct use of the word *necessity* in science; that nothing ought to be called necessary, the denial of which would not be a contradiction in terms. To say that the conclusions of a deductive science are *not* true, although the inductions, or assumptions, *are*, involves a contradiction; & therefore the conclusions of all deductive sciences were called, by the ancients, necessary propositions. Whatever property of a thing could be deduced from its essence, that is, from the properties included in its definition, was a *proprium*, and was said to be predicated *necessarily*.

[§3]

[¶2] There is another set of the elementary generalizations of mathematics, the axioms, which are not hypotheses; in which there is no fiction, but which really are exactly and literally true. That things which are equal to the same thing are equal to one another, is as true of the lines and figures in nature as it would be of the imaginary ones assumed in the definitions. In this respect however, Mathematics are only on a par with most other sciences. In almost all sciences there are some general propositions which are exactly true, while the greater part are but very close approximations to the truth. Thus in mechanics, the first law of

motion, that of the *inertia* of matter, is true without qualification and without the slightest particle of error; it is not affected by the frictions and rigidities, and miscellaneous resistances which qualify, for example, the theories of the lever and the pulley. In optics, the rectilineal propagation of light through the same medium, the equality of the angles of incidence and of reflection, are inductions of the same sort; nay, even in chemistry many of the propositions which express the properties of simple bodies are true without qualification; not being at all affected by those slight impurities which may be supposed to remain in the most carefully made chemical preparations. The rotation of the earth in twenty four hours of the same length as in our time, has gone on since the first recorded observations without the increase or diminution of one second in all that period. These are inductions which require no fiction to make them be received as accurately true: but along with them there are others, as for instance the propositions respecting the figure of the earth, which are but approximations to the truth, and to make the science deductive we must *feign* that these are exactly true although they really want something of being so.

[*]It will doubtless be said, that the axioms of mathematics differ from our inductions respecting the rotation of the earth, the laws of motion, &c. in this, that although the latter *are* universally true, it is possible to *conceive* that they might not be so: the earth might stand still, and matter *might* have spontaneous motion: but the axioms of mathematics cannot be *conceived* not to be true; that things which are equal to the same thing should be unequal to one another, is unconceivable by the human mind: these, therefore, are entitled to be called necessary truths; for though the denial of them is not a contradiction in terms—it is a supposition which is inconceivable.

To this there is, as it appears to me, a completely satisfactory answer, but as it belongs to the region of transcendental metaphysics, I will merely indicate it and pass on. That the falsity of any proposition is inconceivable to us, is no proof that our belief in the proposition was not originally the result of experience. It is a consequence of the general laws of the human mind that when anything whatever is true of *all* objects of which we have ever had experience—when we have never had perception of any object which had not, or even which *seemed* not to have, the property in question, we are unable to conceive any object without it.

The acknowledged laws of association obviously account for this. We can for example, conceive the sun or moon falling, because though we never saw them fall, we have seen other things fall: but we never saw any object without something beyond it, nor had any sensation without something following it; therefore, we cannot conceive an object without having the idea irresistibly raised of some other object beyond it; nor a sensation, without having the idea irresistibly raised of some other sensation following it; we cannot conceive any *end* to space or time; the one irresistibly appears to us infinite and the other eternal. In like manner, the proposition, The sums of equal things are equal, being true (and seen to be true at the first glance) of all objects whatsoever, it is no more than natural that so strong an association should be formed, between the conception of equal objects, and that of equal sums, that we are utterly incapable of imagining the former without the latter.

For these reasons, which are to my mind conclusive, I cannot admit that what

[**In the rewriting the following seven paragraphs were greatly altered and expanded into* Chap. v, §6 *and* Chap. vi, §1.]

is not conceivable by the human understanding, cannot *be*; nor that propositions, the contradictories of which are unconceivable, stand upon at all higher or stronger grounds of evidence than any other propositions which sufficient experience has shewn to be universally true. The propositions whose contradictories are inconceivable are not *truer*, or more necessarily true than the others, but are only wider generalizations; inductions coextensive with the whole universe; propositions which are true of *all things* known to our experience.

If, however, the reader, adopting a different view of the origin of our knowledge, connected with a different system of transcendental metaphysics, should reject the opinion, that the axioms of mathematics rest upon the evidence of experience; he will still admit all that is necessary for the purposes of this work, if he acknowledges that these truths, whatever be their evidence, first became known to us in particular cases. That this is the fact, was pointed out to us by Mr. Dugald Stewart, who was most adverse to the doctrine that they are truths resting on experience. But though he held that the proposition, Things equal to the same thing are equal to one another, is intuitively and not experimentally evident, he held, that it is intuitively evident in each particular case, and that the axiom is but a statement in general terms of what we perceive to be true when we examine any particular case. Even if we admit the axioms to be necessary truths, it does not affect the account we have given of the reasoning process. Inference is still only from particulars to particulars; but at every step at which the major of a syllogism is an axiom, then according to our theory there is an inference from particulars to particulars, but on the theory of necessary truths there is (instead of any inference) a direct perception of a fresh set of particulars.*

Whichever theory we adopt on the subject of axioms, whether we consider them as very comprehensive inductions, or as necessary truths; Geometry is not deduced from the axioms alone, but from the axioms together with those assumptions which are called the Definitions; and those assumptions not being exactly true, the conclusions of Geometry are so far from being necessary truths, that they are not so much as truths at all; but only very close approximations to truths; and necessary, only in the sense of necessarily *following* from the assumptions; being propositions which we are obliged to assume if we make those

*In the text we have in conformity to the most generally received doctrine, considered the axioms as among the first principles of geometry, and have therefore considered them as obtained by induction, because they certainly *might* be so obtained. Many of them however may be deduced from propositions similar to the sò-called Definitions; thus if instead of the axiom Magnitudes which will coincide are equal, we introduce a definition, Equal magnitudes are those which may be so applied to one another as to coincide, the three axioms which follow (Magnitudes which are equal to the same are equal to one another, If equals are added to equals the sums are equal, If equals are taken from equals the remainders are equal) may be demonstrated by an imaginary superposition resembling that by which the fourth proposition of the first book of Euclid is demonstrated.

Although, however, these three axioms and several others, must be struck out of the catalogue of independent elementary truths, of which the other truths of geometry are but cases and illustrations; two or three of those elementary truths will be found in the list of axioms; two or three fundamental principles, not capable of being demonstrated: & these, together with the assumptions contained in some of the definitions, in so far as these assumptions are true, constitute those Laws of Nature, which will be hereafter specified as the subject with which the science of pure Mathematics is conversant.

first assumptions; and to deny which, affirming the assumptions, would be a contradiction in terms.

If there be any Deductive Science which has the appearance of being a system of necessary truth, it must be one which is deduced wholly from propositions exactly true, and not at all from hypotheses or assumptions which are only approximations to truth. If any Science has this character, it must be the science of Numbers; the theory of the Calculus; Arithmetic and Algebra. This, therefore, is a case which seems to merit examination apart.

[Chapter vi: The Same Subject Continued*]

[§2]

[¶1] There are many philosophers who would solve the difficulty apparently inherent in this case, by representing the propositions of the science of Numbers as merely verbal, and its processes as mere transformations of language, substitutions of one expression for another. The proposition, Two and One are equal to Three, is not, according to these philosophers, a *truth*, is not the statement of any fact in nature, but a mere Definition of the word *Three*; a statement that mankind have agreed to give the name of Three to the same thing which they already called by the name Two and One. According to this doctrine, the longest process in algebra is but a repetition of such operations as the foregoing, a series of translations of the same fact out of one language into another: though how, after such a series of translations, it comes out a very different fact, (as when we demonstrate a new geometrical theorem by Algebra) they have not explained; and it is a difficulty which is fatal to their theory.

[¶3] It must be acknowledged, that there are two peculiarities in the processes of arithmetic and algebra which render the above theory very plausible, and have not unnaturally rendered those sciences the stronghold of Nominalism. The doctrine that we can ascertain facts, detect the hidden processes of nature, by an artful manipulation of language, is so contrary to common sense that a person must have made some advances in philosophy to believe it; for to believe any thing so difficult of belief, a person must see far enough to come within sight of some great apparent difficulties on the other side. Now the difficulty which has made many persons Nominalists is the difficulty of believing the reasonings of Arithmetic and Algebra to be anything but verbal processes. For we do not carry any ideas along with us when we use the symbols of those sciences. In a geometrical demonstration we have a diagram in our head, and AB, AC are always present to our imagination as lines, intersecting other lines, forming an angle with one another and the like: but not so *a* and *b*. These may represent lines or anything else, but the lines or anything else are never thought of; nothing is realized in our imagination but *a* and *b*. The ideas which they represent are banished from the mind during every intermediate part of the process between the beginning when the premisses are translated from things into signs, and the end when the conclusion is translated back from signs into things. Nothing, then, being in the reasoner's mind but the symbols, what can seem more absurd than to pretend that the reasoning process has to do with anything but the symbols? It seems one of Bacon's Prerogative Instances, an *experimentum crucis* on the nature of reasoning itself.

[¶4] Nevertheless it will appear on consideration, that this apparently decisive instance is no instance at all; that there is in every step of an arithmetical or algebraical calculation a real induction, a real inference of facts from facts; and that what disguises the induction is merely the extremely comprehensive nature of the induction itself, and the consequent extreme generality of the language. All numbers must be numbers of something: *Ten*, must mean ten bodies, or ten smells, or ten sounds, &c. There are no such things as numbers in the abstract.

[**There is no chapter break here in the Early Draft*; see 1090n.]

But though they must be numbers of something, they may be numbers of anything. The propositions therefore concerning numbers, have the remarkable peculiarity that they are true of all things; of all objects, all entities whatever, known to our experience. All things whatever possess quantity; consist of parts which may be numbered; and therefore all the properties of numbers are true of them. That half of four is two, must be true whatever object the word four represents, whether four miles, or four quarters of a mile, four ounces, four shillings, four minutes, or four bars of a piece of music. The properties of the number four are properties of all Things possessing the attribute which that word connotes; that is of all things whatever as soon as they are divided into four equal parts. But algebra extends the generalization much farther: every number represents *that* number of all *Things*, but every algebraical symbol represents all Numbers; every algebraical equation is a proposition affirmed of all numerable things into whatever parts divided or by whatever number designated: the proposition 2(a+b) = 2a + 2b, is a truth coextensive with the whole Creation. Since, then, in algebraical reasonings, the truths we have to deal with are true of all Things whatever, and not, like those of Geometry, true of lines only, or angles only; it is no wonder that the symbols should not excite in our minds ideas of any Things in particular: the mere letters, *a*, *b*, *x*, *y*, *z*, do as well for the representatives of Things in general, as any more complex conception. But, that we are conscious of their being signs of Things, is evident from the fact, that our whole process of reasoning is carried on by predicating of them the properties of Things. At each step in solving an algebraical equation, what do we do? We apply to *a*, *b*, and *x*, the propositions that equals added to equals make equals; that equals taken from equals leave equals; and other propositions deducible from these: which are not properties of letters, or of signs of any kind, but of all magnitudes, that is, of all things, and are quite without meaning unless so understood. At each step, therefore, there is an induction (or call it, if you adopt the other theory, an intuition) but in any case, the perception or the inference is concerning Things, not symbols: although as any Things whatever will serve the turn, there is no necessity for keeping the idea of the Thing at all distinct, and consequently the process of thought may in this case be allowed without danger to do what all processes of thought when they have been performed often will do if permitted, namely to become entirely mechanical. Hence the general language of algebra comes to be used familiarly without exciting ideas, just as all other general language is prone to do from mere habit: but when we look back, to see from whence the probative force of the process is derived, we find that at every single step, unless we consider ourselves to be thinking and talking of the Things, and not of the mere symbols, the evidence fails.

[¶5] In addition to the circumstance which we have now mentioned, there is another circumstance which gives great plausibility to the notion that the propositions of arithmetic and algebra are merely verbal. This is, that when they are considered as propositions respecting Things, they have the appearance of being all of them identical propositions. The proposition, Two and One are equal to Three, considered as an assertion respecting objects,—for instance, "Two pebbles and one pebble are equal to three pebbles,"—does not assert equality between two collections of pebbles, but actual identity. It affirms that if we put one pebble to two pebbles, those very pebbles are three. The objects, therefore, being absolutely identical, and the mere assertion that objects are themselves, being insignificant, it seems but natural to consider the proposition, Two and one are

equal to three, as asserting merely identity of signification between the two names.

[¶6] The answer to this is short and conclusive. The expressions, "Two pebbles and one pebble," and the expression "Three pebbles," do indeed stand for the same aggregations of objects, but they do not stand for the same sensations; they are names of the same objects, but of those objects in two different states: although they *de*note the same thing, their *con*notation is different. Three pebbles in two separate parcels, and three pebbles in one parcel, do not make the same impression on our senses; and the assertion that the very same pebbles may by an alteration of place be made to produce either the one set of sensations or the other, is not an identical proposition though it is a very familiar one. It is a truth known to us by early and constant experience; an *inductive Truth*; and such truths are the foundation of the Science of Number. The fundamental truths of that science, all rest on the evidence of sense; they are proved by shewing to our eyes and our fingers, that any given number of objects, ten balls for example, may by separation and rearrangement exhibit to our senses all the different sets of numbers the sum of which is equal to ten. And all the improved methods of teaching Arithmetic to young children, proceed upon a knowledge of this fact. All who wish to carry the child's *mind* with them in learning Arithmetic—all who (as Dr. Biber in his remarkable Lectures on Education expresses it) wish to teach *numbers* and not mere *cyphers*—now teach it through the evidence of the senses in the manner we have now described.*

[¶7] Arithmetic is indeed founded upon Definitions in the same sense as Geometry is; the proposition, "Three is two and one," may be called a definition of Three, as the proposition, "A circle is a figure bounded by a line which has all its points equally distant from a point within it," is called a definition of a circle. But the proposition which is one of the fundamental principles of Geometry is, that figures exist answering to this description; and the fundamental truth in arithmetic is, that parcels of objects exist which may be separated into two and one. These propositions being granted, we call the figures circles and the parcels Three's and thus superadd two definitions of words to two assertions respecting matters of fact.

[¶8] It being shewn by the considerations now adduced, that the science of Number is not any exception to the conclusion we had previously arrived at, viz. that the processes even of Deductive Sciences are wholly Inductive; it remains to examine whether this science resembles Geometry in the further circumstance that some of its Inductions are not exactly true; and that the peculiar certainty ascribed to it, on account of which its propositions are called Necessary Truths, is fictitious, and the result of a Hypothesis.

[§3]

[¶1] The inductions of Arithmetic are, first, those which we have just expounded, One and one are two, Two and one are three, &c. which may be called the Definitions of the various numbers, in the geometrical sense of the word Definition, though not in the logical; and secondly two Axioms, "The sums of

*See for various exemplifications, Professor Leslie's Philosophy of Arithmetic; and see also one of the best books ever written for educating the intellect of a young child, Mr. Grant's [*Arithmetic for Young Children*] published by the Society for the Diffusion of Useful Knowledge. [*The space for the title of Grant's book was left blank in the MS.*]

equals are equal," and "The differences of equals are equals;" two only are needed, for the corresponding propositions respecting unequals may be demonstrated from these by way of *reductio ad absurdum*. [¶2] Both the definitions and these axioms, as already remarked, are inductive truths, true of all objects whatever, and when true at all, exactly true: there is no fiction involved, no assumption of unqualified truth where there is a mere approximation to it; the conclusions also, therefore, when true at all are exactly true, and the Science of Numbers, when its conditions are complied with, is an exact science.

[¶3] What I mean by "when true at all" and "when its conditions are complied with," is this. In propositions concerning numbers there is a condition implied, without which none of them would be true; and that condition is an assumption, which may be false. The condition to which I allude is, that $1 = 1$; that all the numbers are numbers of the same unit, or of equal units. Let this be doubtful, and not one of the propositions of arithmetic will hold true. How can we know that two pounds and two pounds make four pounds, if some of the pounds may be troy and others avoirdupois? They may not make four pounds of either or of any weight. How can we know that a forty-horse power is equal to itself, unless we suppose that all horses are of equal strength? It is certain that 1 is always equal in *number* to 1, and in that sense there is no impropriety in saying that one hour is equal to one mile, or one mile equal to one inch. Therefore, in the cases (and they are very few) where the mere *number* of objects, or of the parts of an object, is all that is material, the conclusions of arithmetic so far as they go to that alone, are true without any mixture of hypothesis. There are a [*]few such enquiries; as for instance, an enquiry into the number of inhabitants in any country. It is indifferent whether they are grown people or children, strong or weak, tall or short, all we want to ascertain is their number. The science of arithmetic as applicable to such enquiries is an exact science. But whenever from equality or inequality of number, equality or inequality in any other respect is to be inferred, arithmetic carried into such enquiries becomes a hypothetical science like geometry; it must always be assumed that all units are exactly equal in that other respect as well as in number; and this is never precisely true, for one pound weight is never exactly equal to another, nor one mile's length to another: a nicer balance, or more accurate measuring instruments, could always detect some difference. [¶4] We may, therefore, correctly say that the science of number is itself an exact science, but it is not true, as is sometimes supposed, that other sciences become exact sciences by being rendered Arithmetical; by being subjected to the laws of number, that is, brought within the inductions relating to Numbers.

The science of pure Number, that is, the science which takes cognizance of the properties of objects *only* as being numbered, must be called an Exact Science. But as it appears from what has been said, to be a science founded on Inductions, although universal and obvious ones, its truths cannot be called Necessary Truths; unless we call everything necessary, which results from the general laws of the universe. And the other sciences of quantity, that is, of Things considered as divisible into a *number* of *equal* parts—whether they be sciences of Extension, of Weight, of Force, of Motion, of Sound, or of whatever other measurable things—are not exact sciences, and the necessity ascribed to their conclusions is

[**Gathering* P *begins here. This gathering, which concludes the equivalent of* Book II, *ends with sixteen-and-one-half blank folios.*]

only the necessity of inferring them, if we grant a certain hypothesis; a necessity which only means, that we should otherwise incur a self-contradiction.

[§4]

[¶1] To complete the present subject, one observation still remains to be made. This is, that the Method of all Deductive Sciences is hypothetical. They all proceed by tracing the consequences of certain assumptions, leaving it for separate consideration whether the assumptions are true or not, and if not exactly true, whether they are a sufficiently near approximation to the truth. There are obvious reasons for this. To ascertain how far the assumptions are true, is generally a matter of observation which has to be repeated in every fresh case: or if it is to be settled by argument instead of observation, may require different evidence in each different case. But the other part of the process, to determine what else may be concluded when we have found the assumptions to be true—may be performed once for all, and the results held ready to be employed as the occasions turn up for their use. We thus do all beforehand that can be so done, and leave the least possible task to be performed when the case arises, and presses for a decision. [¶2] It is obviously as easy to arrive at new conclusions from facts assumed as from facts observed; from imaginary as from real inductions. Deduction, as we have seen, is inference in this form, *a* is a mark of *b*, *b* of *c*, *c* of *d*, therefore *a* is a mark of *d*, which last may be a fact neither observed nor observable. In like manner it is equally allowable to say, *Suppose* that *a* were a mark of *b*, *b* of *c*, & *c* of *d*, then *a* would be a mark of *d*, which is a proposition we did not think of when we laid down the premises. A system of propositions as complicated as Geometry might be deduced from assumptions which were false; as was done by Ptolemy, Descartes, and many others, in attempting to explain synthetically the phenomena of the universe. Sometimes the same thing is knowingly done for the purpose of shewing the falsity of the assumption; which is called a *reductio ad absurdum*. The reasoning then is as follows: *a* is a mark of *b*, and *b* of *c*; now if *c* were also a mark of *d*, *a* would be a mark of *d*; but *d* is known to be a mark of the absence of *a*; consequently *a* would be a mark of its own absence, which is a self-contradiction: therefore *c* is not a mark of *d*.

[§5]

[¶2] In addition to the reason now stated, other reasons why the Method of a deductive science *must* be hypothetical, will evolve themselves in the progress of that deeper investigation of the nature of Induction, which the time has now come for attempting.

[Book III: Of Induction]

OF INDUCTION IN GENERAL[*]

From the investigations in the preceeding chapter, we have been led to the conclusion, that all Inference, or Reasoning, when it is from facts, *i.e.*, not from something hypothetically assumed, but from something actually believed, is inference from particulars to particulars: except in the solitary case of reasoning from premises supposed not to be arrived at by derivation, but to be directly revealed from heaven; which may as well be general as particular. But even in this case, as in all cases in which we are commonly said to reason from generals to particulars, the process which is called reasoning, and of which the syllogism presents the correct analysis, is in very truth a process of interpretation only; a decyphering of signs.

Deferring for the present all consideration of the case of reasoning from a hypothesis, a process which as we shall see hereafter, holds a most conspicuous place and performs most important functions in philosophy; we proceed to take a closer view of the process to which we are indebted for all our knowledge of the course of nature; reasoning from particulars to particulars: an operation to which the usage of philosophers has attached the name, Induction.

When the inference from facts observed, to facts unobserved is *certain*, it is nearly indifferent, for most purposes, whether we figure to ourselves that operation as a process of reasoning from particulars to particulars, or from particulars to generals. We must bear in mind that generals are merely classes of particulars; in other words collections of particulars, definite in kind, but indefinite in number. And we observed in the last chapter, that whenever our evidences, that is, the various particular cases which we have examined, justify us in drawing an inference respecting even *one* other particular case, we must be justified in drawing that same inference with respect to a whole class of cases. If from our experience of the finite duration of human life, in all the instances which have reached our knowledge, we can infer that ourselves or that any particular person is mortal, we may with exactly the same strength of evidence infer the general proposition, "All human beings are mortal;" and if there were doubt whether the general conclusion were sufficiently borne out, a rateable [*sic*] proportion of the same doubt would attach to the particular one. The inference either does not hold in any case, or it holds in all cases of a certain *kind*; in all cases which, in certain definable respects, resemble those we have observed.

But although there can be no certain inference, and therefore in the strict sense, no inference at all, from one particular case to another, until the evidence is sufficient to establish a general proposition, yet before the enquiry is ripe for a generalization, we may often with considerable confidence anticipate some one or more of the particular cases which will be included in the generalization when made. This affords ground for a distinction very generally made by philosophers,

[**This chapter was so modified in the rewriting that no exact collation is possible. Some of the matter contributed, in small part, to* Bk. II, Chap. iii, §7, *and* Bk. III, Chap. xx. *Gathering* N[2] *begins on this folio.*]

but more familiarly used than accurately understood: the distinction between Induction and Analogy. The term Induction, in accordance with its original acceptation, is commonly appropriated to inferences of which a completed and definite Generalization is the result. Reasoning by Analogy or Analogical Reasoning, are the phrases employed when we conclude from one or more particular cases, to some fresh particular case directly and at once—without framing any general proposition.

As has been already so often remarked, no conclusion from particulars known to particulars unknown, can be *certain* unless the inference admits of being generalized, and becoming a perfect Induction. But it may easily happen, that before our knowledge and examination of particular instances, has reached the point at which we are enabled distinctly to define the extent of the general conclusion which those instances if more accurately known would enable us to establish, we may yet from the closeness of the general resemblance of some new instance to the instances we have observed, be able to conclude, though not with certainty yet with a high degree of probability, that the generalization, whatever instances it does *not* cover, will at least be found to cover that one instance. Here, therefore, if we are obliged to form an immediate conclusion, we conjecturally infer at once from particulars to particulars; without testing the sufficiency of our evidence by passing to the particular conclusion through the medium of a general one. A striking instance of this mode of drawing a conclusion, (though, as we shall see hereafter, it belongs to a species which has some peculiarities, rendering it not in all respects an apt representative of the genus) is the inference we so confidently draw from past experience that the sun will rise tomorrow. We cannot in the present state of our knowledge, generalize this inference. Who will presume to affirm, as a certain truth, that the sun will always rise? or has always risen from eternity? No one. Nor do we understand the sun's nature, and the causes of his continued existence and of the permanency of the laws of the solar system, sufficiently to know upon what his rising or not tomorrow will ultimately depend. If we did, we might at least ascend to the general principle, that he will continue to rise while certain causes endure. But we cannot do even this. We cannot venture to generalize at all. Yet tomorrow looking so like today, and being of all days yet to come, that which looks most like it, we have no hesitation in drawing the inference with the utmost assurance as to that one, the proximate instance; though we should hesitate to affirm confidently that the sun would rise this day twenty thousand years.

In the above instance we do not generalize at all: there are other cases in which we do generalize, but are conscious that our general conclusion does not deserve implicit reliance. For instance if after much intercourse with Hindoos we have usually or always found them accessible to bribes, we might with a high degree of probability presume that a particular Hindoo, of whom personally we knew nothing, would be found to be so. Yet the universal proposition "All Hindoos are accessible to bribes"—could not be inferred from any one person's individual experience, nor would it, in all likelihood be true. Our experience, or the degree of analysis to which we had subjected that experience, has not, we may suppose, enabled us to give to the proposition that exact limitation which would render it a true proposition and yet leave it a general one. We cannot make any generalization on the subject which we can know to be absolutely correct. Not only we cannot [*sic*] say "All Hindoos are accessible to bribes," we cannot even

say, "All Hindoos of such and such a description are so." We must therefore qualify our generalization, by limiting not its extent, but the degree of assurance with which we assert its universality: we must consider it as a proposition not proved to be *literally* true, but to be nearly so: and in concluding to fresh particular instances we must consider our proof as a presumption only, though a strong one; evidence amounting to probability only, not to certainty.

There are thus three cases of inference from particulars to particulars, characterized by three different degrees of strength in the evidence.

1st. The evidence may be sufficient to warrant the unqualified assertion of some universal proposition: every A is B. Or, in other words, we may conclude with absolute certainty that any particular A is B. This may be called, Perfect Induction.

2nd. The evidence may be sufficient to warrant the assertion of some proposition general in form and language, but with the express qualification, that it is only known to be true in *most* of the cases which its terms comprehend, not in all: Most A are B. Or in other words, we may conclude with preponderant probability, but not with absolute certainty, that any particular A is B. This may be termed Imperfect Induction, and is one kind of Analogical Reasoning.

In this class of cases, though we have not certainty, we can measure with considerable assurance, the degree of our approach to it.

3d. The third case is that in which we have not, from the evidence before us, been able to set up any general Proposition, as proved to be true either universally or for the most part; but since a certain case appears to us strikingly to resemble the cases which we are acquainted with, we *dare say* that what we have found to be true in those cases, will be true in that case too, whether true or not in any others. This mode of inference has never, so far as I know, received any other name than that of Analogical Reasoning. The inference can never be more than probable, & although as we have seen, the probability *may* reach the highest degree of strength; it is commonly much less strong in this than in the preceding class of cases; can very seldom be measured with any approach to exactness & is often entirely indefinite and inappreciable. Most reasonings from history are of this kind; and almost all the reasonings of persons of uncultivated minds, in the ordinary affairs of life.

Analogical Reasoning, therefore, when contradistinguished from Induction, means inference of the same kind exactly, but of an inferior degree of strength. Analogical Reasoning is an imperfect Induction; or a conjectural foretaste of an Induction yet to come. Induction, again, is merely Reasoning from perfectly conclusive Analogies, or resemblances. Dugald Stewart, therefore, appears to have made a distinction without a difference, or at least to have expressed the distinction which we have now considered, in a very misleading phraseology, when he distinguishes the evidence of Analogy from the evidence of Experience. The evidence of Experience is nothing, can be nothing, but the evidence of Analogy: when the analogies are conclusive, we call the process Induction; but it is Analogy still. In our analysis of the Syllogism we saw that all inference from experience, is inference from particulars to particulars, and that all inference from particulars to particulars, is from the *resemblance* of the one set of particulars to the other. Resemblance may be incomplete or complete, but it is resemblance still. The proposition, "Food nourishes"—rests Dugald Stewart could say, not upon analogy, but upon experience; the analogy no doubt amounts

in this case to a perfect Induction, but the experience which the conclusion rests upon, is experience of today's food, and yesterday's, not tomorrow's; how then do I know that tomorrow's food will nourish? From its analogy to the food of today.

Induction, then, and Analogical Reasoning, are both of them names for inferences of the same kind, from particulars to particulars; but when the process of inference is certain, we call it Induction: when only probable or conjectural, Analogical Reasoning.

We have next to enquire into the nature and grounds of Induction; the conditions necessary to constitute a perfect, or conclusive Induction; and the means of measuring the degree of probability of the less certain inferences from Analogy.

OF THE VARIOUS GROUNDS OF INDUCTION

[Chapter ii: Of Inductions Improperly So Called]

[§1]

[¶1] Induction is the name given to the operation of the mind, by which we infer that what we know in a particular case or cases, will be true in any other case or cases of a similar kind; or in stricter language, Induction is the process by which a predicate which can be truly affirmed or denied of one or more individuals, is thence inferred to be truly affirmable or deniable of any or all individuals which *resemble* those individuals in certain particulars.

More briefly, Induction is the process by which we conclude that what is true of certain individuals of a class, is true of the whole class; that is, of every other individual in it.

[¶2] But why do we conclude that what can be truly predicated of certain individuals which we know, can be predicated of other individuals which we know not? What is our warrant for so concluding?

In order to answer this question it is necessary to advert to some further distinctions.

[¶3] Induction according to the definition we have given of it, is a process of *inference*, a process from the known to the unknown; and any process involving no inference, any process by which the conclusion we seem to arrive at, is no wider than the premises from which it is drawn, does not fall within our meaning of the word Induction. Yet in most books of logic, we find this laid down as the most perfect, indeed the only quite perfect case of Induction. For in most books of Logic, every process which starts from the less general & terminates in the more general, is called Induction, whether anything be really concluded or not: it is enough that the process admits of being stated in the form, This and that individual A is B, *ergo* every A is B. And when we affirm to be true of a class, what we have previously ascertained to be true of *every* individual in the class, this, which is no conclusion at all, but a mere reassertion of our premises, is sagely affirmed to be the most certain conclusion which Induction ever enables us to arrive at. Thus if we were to say "All the planets shine by reflected light"—because we have examined each of them separately and found this to be true; or "All the Apostles were Jews," because Peter, Paul, John, and each of the other nine were so, this would be called, in the phraseology to which we are adverting, a perfect Induction. There is no harm certainly in calling this Induction, so long as we take care to understand what is meant; but it is Induction in a quite different sense from what we have designated by that name; since it is no inference from facts known to facts unknown, but a mere short hand registration of facts known. In truth, the two simulated argumentations cited above are not generalizations, nor are the propositions which stand as conclusions from them, general propositions. General propositions are those in which the predicate is affirmed or denied of an indefinite, an unlimited number of individuals, viz, of all individuals, few or many, existing or which can exist, possessing the properties connoted by the subject of the proposition. "All men are mortal" does not mean, all men now living, but all men past, present, and to come, actual or possible. When the signification of the subject is limited in such a manner as to denote, not any and every individual falling within a certain general description, but only each of a

number (known, or if unknown, yet knowable) of individuals, marked off and designated *as* individuals; the proposition, however general in its form, is no universal proposition, but is only that very number of singular propositions written in an abridged character. This process, like all other forms of abridged notation, is of great use in philosophy, but it is not a process by which truth can be arrived at. The consideration of it however throws some light upon the case next to be examined.

[§2*] Where the Induction is real, that is, where it consists of a generalization, or extension to an entire class, of a predicate previously known to be true of certain individuals of the class; the grounds which warrant the generalization, will be found to be different, according to the manner in which our knowledge of the premisses is acquired. Those premisses, it is almost unnecessary to repeat, are the singular propositions from which we infer the general one—Now, our knowledge of the truth of these singular propositions can only be derived (unless revealed from heaven) from one of two sources; *observation*, that is, experience; or *demonstration*.

An instance of induction from premisses proved by *observation*, is the one so often cited: All human beings are mortal, for all the human beings of whom there is any record, have, after a certain period, died.

An instance of induction from premisses proved by *demonstration*, is any geometrical theorem proved by a diagram.*

When we demonstrate a theorem by means of a diagram, either visible or only imaginary, the demonstration does not bring out a universal proposition, but only a singular one. In the demonstration of the fifth proposition of Euclid, what is proved? Not that the angles at the base of every isosceles triangle are equal, but only that the angles at the base of the triangle ABC are so. The enunciation of the proposition is not proved by the demonstration, but by a subsequent induction; an induction however of a peculiar kind; more resembling the simulated induction which produced the proposition "All the Apostles were Jews"—than the real induction by which we prove that "All men are mortal;" and yet a real induction, because containing a real inference. We do not indeed infer that all isosceles triangles have their angles at the base equal, because ABC has so. But having proved that ABC has that property, we infer that any other isosceles triangle has it, because we perceive that in the same way by which we have proved it of ABC, we could prove it of any other isosceles triangle. We perceive that if we had chosen to demonstrate it of any other isosceles triangle instead of ABC, we might have put that other triangle in the place of ABC throughout the demonstration, and neither would any of our premisses have ceased to be true, nor would the inference at each of the steps, have less followed from the premisses. The result then being that we have demonstrated our predicate to be true of one individual in the class, and perceived that we might similarly demonstrate it of any other

[**Some of the material in the following twelve paragraphs was used in the major rewriting of* §2.]

*And every geometrical theorem, when proved in the ordinary manner, is proved by a diagram, either constructed on paper or in the mind. Geometry is not usually carried on like Algebra by a mere interchange of arbitrary symbols, the ideas which they represent being banished from the mind during every intermediate part of the process, between the beginning when the premisses are translated from things into signs, and the end, when the conclusion is translated back from signs into things.

individual in the class whether actual or even conceivable, we embody all these inferred and inferrible singular propositions, in one universal proposition, and affirm the predicate of the entire class.

This process of generalization, we may term Induction or not as we find most convenient. It differs from the Induction which is founded on experience, in this, that the general proposition is not inferred from any of the individual cases contained in it, but from ulterior premisses on which even those individual cases themselves rest. This illation cannot be thrown into the form "This and that individual A is B, therefore every A is B." We may rather consider ourselves as demonstrating each individual case seperately, and then gathering them all up into a general proposition; and thus far the process resembles that Induction improperly so called, of which "All the planets shine by borrowed light," was an example.

But on the other hand, the process which we are now considering is a real generalization; it enables us to conclude with the utmost certainty to particular cases which we have not actually examined, which have never even been specifically in our thoughts, and which we only know to be susceptible of the very same demonstration as the cases we examined, because we know that demonstration to be independant of all properties in the examined cases, except those common to them with the unexamined ones. Thus we conclude that all triangles have the sum of their three angles equal to two right angles, not because ABC has so, but because the process which proves ABC to possess that property, took no account of any attribute of ABC, except that of being a triangle.

This process therefore really concludes from the known to the unknown; from the examination of one case only, it proves something to be true of an indefinite multitude of unexamined cases. It agrees therefore with Induction from experience, in the characteristics most important in Philosophy; and may without any inconvenience or confusion be called Induction. The better to distinguish it from the Induction of which Experience is the basis, we shall give it the name of Induction from parity of reasoning.

We may now return to the question which we asked ourselves at the commencement of the chapter: Why do we conclude that what can be truly predicated of certain individuals which we know, can be predicated of other individuals which we know not? What is our warrant for so concluding?

To this question different answers must be given, according as the Induction is from parity of reasoning, or from Experience.

In the case of Induction from parity of reasoning, our warrant for affirming the general proposition, is, that we have a warrant for affirming every singular proposition contained in it. That warrant is demonstration; and the nature of demonstrative evidence cannot yet be explained.

[*]We must, therefore, at present confine ourselves to the case of Induction from Experience. In this case, our warrant for the generalization, is the uniformity of the course of nature. The universe, we find, is so constituted, that whatever is found to be true in any one case, is true in all cases which exactly resemble it.

The explanation and illustration of this principle requires a chapter to itself.

[**In the rewriting, this paragraph formed the basis of* Chap. iii, §1, ¶¶1 *and* 2. *The following paragraph, of course, disappeared.*]

OF THE UNIFORMITY IN THE COURSE OF NATURE

[Chapter iii: Of the Ground of Induction]

[§1]

[¶3] The fact which is our warrant for all inference from experience, is that which has been expressed by philosophers in such forms of language as these; That the course of nature is uniform; That the universe is governed by general laws; & the like. Our belief in this general truth, has been classed by a well-known school of philosophers, as one of the instincts of our nature, and termed our intuitive conviction that the future will resemble the past. Whatever be the origin of the belief, this is a very unphilosophical mode of describing it. Time, in its modifications of past, present, and future, has no relation direct or indirect either with the belief itself or with the grounds of it. We believe that fire will burn tomorrow because it burns today, but we believe on precisely the same grounds, that it burnt before we were born, and that it burns this very day in Cochin China. It is not from the past to the future, *as* past and future, that we infer, but from the known to the unknown; from what we have perceived and been directly conscious of, to what has never come within our personal experience. In this last predicament is the whole region of the future; but also the vastly greater part of the present & of the past.

[¶4] The principle of Induction, then, is that the course of nature is [*]uniform. I am far, however, from giving this large generalization as an *explanation* of Induction. On the contrary it is itself a case of Induction, and one of a very complicated kind. Far from being the first Induction we make, it is one of the very last; and the general proposition in which it is couched has scarcely entered into the conceptions of any but metaphysicians, nor even by them (as we shall see presently) have its extent and limits been always very accurately conceived. Yet, the principle in question, must be considered as the warrant for all our inductions from experience, in this sense, that unless it were true, those inductions would all be fallacious; and this as we have already seen, is the sole mode in which the general propositions, which stand as premisses in our reasonings when thrown into syllogism, ever really contribute to the establishment of the conclusions which stand apparently deduced from them.

Archbishop Whately remarks, that every Induction is an imperfect Syllogism, with the major premiss omitted. The remark is just; though I would rather express it thus, that every Induction may be thrown into the form of a Syllogism by supplying a major premiss. When this is done, the principle which we are now considering, that of the uniformity of the course of nature, will come forth as the invariable major premiss, immediately or remotely of all inductive argumentations; to which accordingly it will stand in the same relation as the major premiss always does; not contributing at all to prove the conclusion, but only assisting somewhat to verify the process by which it is proved.

[¶2, n] From the above remark, that every Induction may be thrown into the form of a Syllogism, Archbishop Whately concludes, that Induction itself is only a peculiar case of ratiocination; & that the universal type of all Inference, or Reasoning, is the Syllogism. This conclusion is directly the opposite of that to

[**From here to the end of the MS, the text is written both verso and recto.*]

which our enquiries have led us. Instead of resolving induction into ratiocination, we have shown that ratiocination, on the contrary, is resolvable into induction. Dr. Whately's conclusion may I think be refuted by merely following up his own argument. He justly observes that the induction, John, Peter, Thomas &c. &c. are mortal, therefore All mankind are mortal, is reduced into the form of a Syllogism, by prefixing as a major premiss the implied assumption, Whatever is true of John, Peter, Thomas &c. &c. is true of all mankind. Thus far all goes smoothly; and Dr. Whately (who, endowed with a penetrating and active, but not persevering intellect, seldom fails to send his sounding line to a greater depth below the surface than his predecessors, & who when he has done this, scarcely seems to care whether he reaches the bottom or not) omitted to ask himself the further question, How we come by this major premiss? It is not self-evident; nay, in all cases of precipitate generalization, it is false. How then is it arrived at? Necessarily either by induction or by ratiocination, and if by induction, then on Dr. Whately's own principles it is by ratiocination still, that is, by a previous syllogism. Proceeding, therefore, to construct this previous syllogism, he will arrive by more or fewer steps at a final or original syllogism, starting from the principle which we are not yet prepared to express in precise terms, but which we have provisionally and popularly expressed in such phraseology as this, The course of nature is uniform. Having reached this ultimate major premiss, we have now the whole field of Induction spread before us, marked out in logical compartments, syllogized through and through; and every instance of Induction is now syllogistically accounted for, except one; but that one unhappily comprehends all the others. All inferences from experience are now resolved into conclusions syllogistically deduced from one general principle; but how did we get at the principle itself? Whence came the universal major? What proves to us that nature is governed by general laws? Point out to us the major of the syllogism of which that is the conclusion,—you cannot. Well, then, here at least is a case of Induction which cannot be resolved into Syllogism. And do not take shelter under the metaphysical doctrine, that the belief in the uniformity of the course of nature is an instinct. Let it be by instinct, if you will, that the child expects fire to burn him today, because it burnt him yesterday; let the inference from particulars to particulars be the result of instinct, as much as you please, but who ever dreamed of arriving by instinct at a broad metaphysical generalization? It may be instinct which makes a dog eat when he is hungry, but there is no instinct which tells him that "Every animal who is hungry has need to eat." The comprehensive principle that the universe is governed by general laws, is itself the result of Induction; it is a generalization from the individual instances which have fallen within our personal observation; & moreover it is a generalization founded on prior generalizations: we never should have thought of making it, if we had not previously arrived at a knowledge of some of the laws themselves, which could have been no otherwise than by Induction, although Dr. Whately's theory supposes that we never could have made any Induction without first assuming that general maxim.

[*]There is no impropriety however, in speaking of this general truth, that the course of nature is uniform, as the *warrant* for all Induction. If the course of nature were not uniform, inference from experience would be impossible; Induction would convey no assurance of the truth of its results; and no conclusion got

[**The following four paragraphs contributed to the rewriting of the final paragraph of* §1.]

at by Induction, is to be relied upon any farther than as it can be shewn that the falsity of the conclusion would be inconsistent with that principle; that if the conclusion were not true, the course of nature would not be uniform.

It is therefore of the utmost importance to conceive clearly how far and in what sense it is true that the course of nature is uniform; in order that we may know, what are the Inductions to which the warrant of the principle extends.

In ascertaining this, it will be unnecessary to enter into the origin and psychological analysis of our belief in the uniformity of nature; i.e. in the evidence of Experience. Some philosophers have professed to resolve this mental phenomenon into a case of the Law of Association, others regard it as an original and ultimate element of our nature. To determine which of them is right, is a problem in the higher or transcendental metaphysics, into which it is not our business to enter. Either theory equally supposes that the process of concluding from Experience, is one in which we are liable to err, and that experience itself is the rule which ought to guide us in determining how far we can safely infer from experience. Whichever theory we adopt, experience itself can alone determine how far and in what sense experience is uniform; and the tendency to generalize from observation, whether innate or not, must be indulged within limits which it is the province of observation itself to find out. This is sufficient for our purpose, and we, therefore, proceed to enquire what is the real nature and what the limits of the uniformity in the course of nature.

We have already remarked that such a proposition as this "The course of nature is uniform," possesses rather the brevity suitable for popular than the precision required in philosophical language. Indeed, its terms require to be explained, & a stricter than their ordinary meaning given to them, before the proposition can be admitted as true. [§2, ¶1] Every person's consciousness assures him that he does not always expect uniformity in the course of events; he does not always believe that the future will resemble the past. Nobody believes that it will rain tomorrow, because it rained today. Nobody expects to meet the same man at the same spot every time he walks out, merely because he has once met him. On the contrary everybody is surprised; and mentions it as something extraordinary if the course of nature is constant, and resembles itself, in these cases.

[¶2] The course of nature is in truth not only uniform, it is also infinitely various. Some phenomena seem always to recur in the very same combinations in which we met them at first; others, which we have been accustomed to regard as equally bound down to a particular set of combinations, we unexpectedly find detached from some of the elements with which we had always found them conjoined, and united to others of quite a contrary description. To an inhabitant of central Africa half a century ago, no fact probably appeared to rest upon more uniform experience than this, that All human beings are black. To Europeans not many years ago, the proposition, All swans are white, appeared an equally decided instance of uniformity in the course of nature. Further experience has proved to both that both were wrong; but very many centuries elapsed before this additional experience came. During all these centuries mankind believed in a uniformity of the course of nature, where no such uniformity existed.

[¶3] According to the notion which the ancients seem to have entertained of Induction, these two were cases of as legitimate Induction as any other. In these two instances, in which the ground of inference must have been insufficient since the conclusion was false, there was yet in their conception of Induction, as much ground for drawing the inference as there is in any case whatever. This sort of

Induction was that which Bacon describes as *Inductio per enumerationem simplicem, ubi non reperitur instantia contradictoria*; recording merely such instances as offered, and if all those instances agreed, generalizing upon them. [¶5] It is chiefly by pointing out the insufficiency of this kind of Induction, that Bacon merited the title of Founder of the Inductive Philosophy. The notions which he introduced, of a better kind of Induction than this, though still deficient in definiteness and precision, have had, if not all the influence which has occasionally been ascribed to them, yet a very large share of influence in causing the great and rapid progress of physical science since his time. Even to physical science however the application of just views of induction is yet far from perfect; and the chief reason why the moral and political sciences are so far behind the physical, is that to them there is yet scarcely a trace of the application of the improved notion of Induction which Bacon originated. The current and approved modes of reasoning on those subjects are still of the very kind which Bacon exploded: the Induction employed is the very *Inductio per enumerationem simplicem* which he condemns; and the experience, which we hear so confidently appealed to, is still in his own forcible words, "mera palpatio."

[*]This, in fact, is the kind of Induction, if such it can be called, which is natural to the human mind when unenlightened by philosophy. That tendency, which some call an instinct and others an association, to infer 'the future from the past,' the known from the unknown, is simply a tendency to expect that what has been found true once or several times will be found true again. It matters little whether the instances are few or many, conclusive or inconclusive. Those are considerations which occur only on reflection; the expectation follows the past experience, provided that be uniform,—provided no experience of a conflicting character comes unsought: the notion of seeking it, of experimenting for it, of *interrogating* nature as Lord Bacon has it, is of quite subsequent growth. The experience of uninstructed human minds is purely passive experience: they take such facts as present themselves, they do not ask themselves what facts they want, to enable them to come to a sure conclusion, and then search for these.

We are not, however, now to consider how evidence is to be *sought*, which is a question for the *Art* of Logic; we are to look out for a test of the *sufficiency* of evidence, the only question which belongs to the Science.

[§3]

[¶1] It is manifest that there are correct and incorrect Inductions; and that some which have for centuries been thought to be correct, were incorrect. That all swans are white, must have been an incorrect Induction, since it terminated in a false conclusion. The evidence, therefore, was insufficient. The experience, however, from which the inference was drawn, was genuine. From the earliest records, the observation of all the inhabitants of the known world, was unanimous on the point. The uniform experience, therefore, of the inhabitants of the known world, all agreeing in one common result, without a single known instance of variation from that result, is not always sufficient to establish a general conclusion.

[¶2] But let us now turn to an instance apparently very similar to this. Mankind were wrong, it seems, in concluding that all swans are white: are we also wrong, when we conclude that all men's heads grow above their shoulders, and never

[**The following two paragraphs contributed to the rewriting of* ¶¶3 *and* 4.]

beneath, in spite of the conflicting testimony of the naturalist Pliny? As there were black swans, although civilized man had existed on the earth nearly three thousand years without meeting with them, may there not also be "men whose heads do grow beneath their shoulders," notwithstanding an almost equal unanimity of testimony to the contrary from all observers? Most persons will answer No: it was more credible that a bird should vary in its colour, than that man should vary in the relative position of his principal organs. And why more credible? Apparently because there is less constancy in the colours of animals, than in the general structure of their internal anatomy. But how do we know this? From experience doubtless. Then it is experience (as we have once before said), which must tell us, in what cases or what classes of cases experience is uniform. We must consult experience in order to learn from her, under what circumstances arguments from her will be valid. The course of nature is uniform in certain cases; in certain others, it is not uniform: & the Theory of Induction must begin by settling what these cases are.

[¶3] It is obvious that there are cases in which we reckon with the utmost confidence upon uniformity, & others in which we do not reckon upon it at all. In some we feel complete assurance that the future will resemble the past, that the unknown will be precisely similar to the known. In others, however uniform the result obtained from all the cases which we have observed, we draw from thence no more than a feeble presumption that the same result will hold in other cases. That a straight line is the shortest distance between any two points we feel convinced is true even in the region of the fixed stars. When a chemist announces the existence & properties of a newly discovered substance, if we have confidence in his accuracy of observation, we feel no doubt that the conclusions he has arrived at will hold universally, although the induction is founded but on a single instance. We do not withhold our assent, waiting for a repetition of the experiment; or if we do, it is from a doubt whether the one experiment was properly made, not whether if properly made it would be conclusive. Here then is a general law of nature inferred without hesitation from a single instance; a universal proposition from a singular one. Now mark another case, and contrast it with this: Not all the instances which have been observed since the beginning of the world, in support of the general proposition that all crows are black, would be considered a sufficient presumption in favour of the truth of the proposition, to outweigh the testimony of one unexceptionable witness who should affirm that in some region not yet explored, he had caught and examined a crow and had found it brown.

[¶4] Why is a single instance in one case sufficient for a complete Induction, while in another myriads of concurring instances without a single exception known or presumed, goes [*sic*] so slight a way towards establishing a general proposition? Whoever can solve this question, knows more of the Philosophy of Logic, than the wisest of the ancients, and has solved the great problem of Induction.

Appendix B

Supplementary Note to Book II, Chapter iii ("Of the Functions, and Logical Value of the Syllogism"), in the 3rd (1851) and 4th (1856) editions

[This note, added in the 3rd edition (1851), was replaced in the 5th edition (1862) by the note to p. 205, which in part retains the earlier wording. The text below is that of the 4th edition (1856), with variant notes giving the 51 readings, and those of the later editions as found at pp. 205 ff.]

Note Supplementary to the Preceding Chapter

This theory of the syllogism, (which has received the important adhesion of Dr. Whewell,*) has been controverted by a writer in the *British Quarterly Review*.† The doctrine being new, discussion respecting it is extremely desirable, to ensure that nothing essential to the question escapes observation; and I shall, therefore, reply to this writer's [a]arguments[a] with somewhat more minuteness than their strength may seem to require.

The reviewer denies that there is a *petitio principii* in the syllogism, or [b]that the proposition, All men are mortal, asserts or assumes that Socrates is mortal. In support of this denial, he argues that we may, and in fact do, admit the general proposition that all men are mortal, without having particularly examined the case of Socrates, and even without knowing whether the individual so named is a man or [c]something else[c]. But this of course was never denied. That we can and do draw conclusions concerning cases specifically unknown to us, is the datum from which all who discuss this subject must set

**Of Induction*, p. 85. [*Philosophy of Discovery*, p. 289.]

†For August 1846.["Mill's System of Logic," *British Quarterly Review*, IV, pp. 1–38.]

[a-a]51 objections
[b-b]1114 [*also in* 62, 65, 68, 72; *see* 1111n *above, and cf.* [j-j]1114 *below*]
[c-c]51 not

out. The question is, in what terms the evidence, or ground, on which we draw these conclusions, may best be designated—whether it is most correct to say, that the unknown case is proved by known cases, or that it is proved by a general proposition including both sets of cases, the unknown and the known? I contend for the former mode of expression. I hold it an abuse of language to say, that the proof that Socrates is mortal, is that all men are mortal. Turn it in what way we will, this seems to me to be asserting that a thing is the proof of itself. Whoever pronounces the words, All men are mortal, has affirmed that Socrates is mortal, though he may never have heard of Socrates; for since Socrates, whether known to be so or not, really is a man, he is included in the words, All men, and in every assertion of which they are the subject. If the reviewer does not see that there is a difficulty here, I can only advise him to reconsider the subject until he does: after which he will be a [d]better[d] judge of the success or failure of an attempt to remove the difficulty.* That he had reflected very little on the point when he wrote his remarks, is shown by his oversight respecting the *dictum de omni et nullo*. He acknowledges [p. 27] that this maxim as commonly expressed,—"Whatever is true of a class, is true of everything included in the class," is a mere identical proposition, since the class *is* nothing but the things included in it. But he thinks this defect would be cured by wording the maxim thus,—"Whatever is true of a class, is true of everything which *can be shown* to be a member of the class:" as if a thing could "be shown" to be a member of the class without being one. If a class means the sum of all the things included in the class, the things which can "be shown" to be included in it are [e]a part of the sum[e], and the *dictum* is as much an identical proposition with respect to them as to the rest. One would almost imagine that, in the reviewer's opinion,

*[*not in* 62, 65, 68, 72] There is a striking passage in the *Metaphysics* of Aristotle (commencement of Bk. III) on the necessity of beginning the study of a subject by a clear perception of its difficulties. *Εστι τοὶς εὐπορῆσαι βουλομένοις προὔργου τὸ διαπορῆσαι καλῶς. ἡ γὰρ ὕστερον εὐπορία λύσις τῶν πρότερον ἀπορουμένων ἐστί. λύειν δ' οὐκ ἔστιν ἀγνοοῦντα τὸν δεσμόν· ἀλλ' ἡ τῆς διανοίας ἀπορία δηλοῖ τοῦτο περὶ τοῦ πράγματος . . . διὸ δεῖ τὰς δυσχερείας τεθεωρηκέναι πάσας πρότερον, τούτων τε χάριν καὶ διὰ τὸ τοὺς ζητοῦντας ἄνευ τοῦ διαπορῆσαι πρῶτον, ὁμοίους εἶναι τοῖς ποῖ δεῖ βαδίζειν ἀγνοοῦσι. καὶ πρὸς τούτοις, οὐδ' εἴ ποτε τὸ ζητούμενον εὕρηκεν ἢ μή, γινώσκειν. τὸ γὰρ τέλος τούτῳ μὲν οὐ δῆλον, τῷ δὲ καλῶς προηπορηκότι δῆλον.* [995[a]27–31,33–995[b]2. Ed. Hugh Tredennick. 2 vols. London: Heinemann, 1933, 1935, Vol. I, p. 96 (Bk. III, Chap. i). The passage occurs near the beginning of what is generally referred to as Bk. II, though some texts give it as Bk. III.]

[d]–[d]51 more competent
[e]–[e]51 a part of these; it is the sum of them too] 62, 65, 68, 72 part of the sum

things are not members of a class until they are called up publicly to take their place in it—that so long, in fact, as Socrates is not known to be a man, he *is not* a man, and any assertion which can be made concerning men does not at all regard him, nor is affected as to its truth or falsity by anything in which he is concerned.

[f]The difference between the reviewer's theory and mine may be thus stated. Both admit that when we say, All[f] men are mortal, we make an assertion reaching beyond the sphere of our knowledge of individual cases; and [g]that[g] when a new individual, Socrates, is brought within the field of our knowledge by means of the minor premise, we learn that we have already made an assertion respecting Socrates without knowing it: our own general formula [h]being[h], to that extent, for the first time *interpreted* to us. But according to the reviewer's theory, [i]the smaller assertion is proved by the larger: while I contend, that both assertions are proved together, by the same evidence, namely, the grounds of experience on which the general[i] assertion was made, and by which it must be justified.

[j]The reviewer says [p. 22], that if the major premise included the conclusion, "we should be able to affirm the conclusion without the intervention of the minor premise; but every one sees that that is impossible." A similar argument is urged by Mr. De Morgan (*Formal Logic*, p. 259): "The whole objection tacitly assumes the superfluity of the minor: that is, tacitly assumes we know Socrates* to be a man as soon as we know him to be Socrates." The objection would be well grounded if the assertion that the major premise includes the conclusion, meant that it individually specifies all it includes. As

*[56] Mr. De Morgan says "Plato," but to prevent confusion I have kept to my own *exemplum*.

f-f51 The reviewer says that if the major premiss included the conclusion, "we should be able to affirm the conclusion without the intervention of the minor premiss; but every one sees that that is impossible." It does not follow, because the major premiss contains the conclusion, that the words themselves must show all the conclusions which it contains, and which, or evidence of which, it presupposes. The minor is equally required on both theories. It is respecting the functions of the major premiss that the theories differ; whether that premiss merely affirms the existence of proof, or is itself part of the proof—whether the conclusion follows from the minor and major, or from the minor and the particular instances which are the foundation of the major. On either supposition, it is necessary that the new case should be perceived to be one coming within the description of those to which the previous experience is applicable: which is the purport of the minor premiss. When we say that all

g-g+56, 62, 65, 68, 72

h-h51 is

i-i51 it is our having *made* the assertion which proves the assertion: while I contend that the proof is not the assertion, but the grounds (of experience) on which the

j-j1114+56 [*cf.* b-b1114 *above*]

however the only indication it gives is a description by marks, we have still to compare any new individual with the marks; and to show that this comparison has been made, is the office of the minor. But since, by supposition, the new individual has the marks, whether we have ascertained him to have them or not; if we have affirmed the major premise, we have asserted him to be mortal. Now my position is that this assertion cannot be a necessary part of the argument. It cannot be a necessary condition of reasoning that we should begin by making an assertion, [k]a part of which that assertion is to be employed in proving[k]. I can conceive only one way out of this difficulty, viz. that what really forms the proof is *the other* part of the assertion; the portion of it, the truth of which has been ascertained previously: and that the unproved part is bound up in one formula with the proved part in mere anticipation, and as a memorandum of the nature of the conclusions which we are prepared to prove.

With respect to the minor premise in its formal shape, the minor as it stands in the syllogism, predicating of Socrates a definite class name, I readily admit that it is no more a necessary part of reasoning than the major. When there is a major, doing its work by means of a class name, minors are needed to interpret it: but reasoning can be carried on without either the one or the other. They are not the conditions of reasoning, but a precaution against erroneous reasoning. The only minor premise necessary to reasoning in the example under consideration, is, Socrates is *like* A, B, C, and the other individuals who are known to have died. And this is the only universal type of that step in the reasoning process which is represented by the minor. Experience, however, of the uncertainty of this loose mode of inference, teaches the expediency of determining beforehand what *kind* of likeness to the cases observed, is necessary to bring an unobserved case within the same predicate: and the answer to this question is the major. [l] Thus the syllogistic major and the syllogistic minor start into existence together, and are called forth by the same exigency. When we conclude from personal experience without referring to any record—to any general theorems, either written, or traditional, or mentally registered by ourselves as conclusions of our own drawing, we do not use, in our thoughts, either a major or a minor, such as the syllogism puts into words. When, however, we revise this rough inference from particulars to particulars, and substitute a careful one, the revision consists in selecting two syllogistic premises. But this neither alters nor adds to the evidence we had before; it only puts us in a better position for judging whether our inference from particulars to particulars is well grounded.[jb]

[k–k]62, 65, 68, 72 which is afterwards to be employed in proving a part of itself

[l]72 The minor then identifies the precise kind of likeness possessed by Socrates, as being the kind required by the formula. [*cf.* 207[h–h] *above*]

[m][n]This brings me to the reviewer's next objection;[n] that the formula in which the major is left out—"A, B, C, &c. were mortal, therefore the Duke of Wellington is mortal," does not express all the steps of the mental process, but omits one of the most essential, that which consists in recognising the cases A, B, C, as *sufficient evidence* of what is true of the Duke of Wellington. This recognition of the sufficiency of the induction he calls an "inference," and says, that its result must be interpolated between the cases A, B, C, and the case of the Duke of Wellington; and that "our final conclusion is from what is thus interpolated, and not directly from the individual facts that A, B, C, &c. were mortal." [P. 25.] [o]It is true, as the reviewer says, that the major is an affirmation of the sufficiency of the evidence on which the conclusion will be grounded. But to my thinking it would seem that the conclusion is inferred from the evidence itself, and not from a recognition of the sufficiency of the evidence. I infer the presence of my friend because I see him, and not because I recognise that my eyes are open, and that eyesight is a means of knowledge. In all operations which require care, it is good to assure ourselves that the process has been performed accurately: but the testing of the process is not the process itself; and besides, may have been omitted altogether, and the process be correct. Now it is precisely because that operation is omitted in ordinary unscientific reasoning, that there is anything gained in certainty by throwing reasoning into the syllogistic form. To make sure, as far as possible, that it shall not be omitted, we make the testing operation a part of the reasoning process itself. We insist that the inference from particulars to particulars shall pass through a general proposition. But this is a security for good reasoning, not a condition of all reasoning; and in some cases not even a security. Our most familiar inferences are all made before we learn the use of general propositions; and a person of untutored sagacity will skilfully apply his acquired experience to adjacent cases, though he would bungle grievously in fixing the limits of the appropriate general theorem. But though he may conclude rightly, he never, properly speaking, knows whether he has done so or not: he has not tested his reasoning. Now this is precisely what forms of reasoning do for us. We do not need them to enable us to reason, but to enable us to know whether we reason correctly.

It may be added, in further answer to the reviewer, that,—even when the test has been applied, and the sufficiency of the evidence recognised,—if it is sufficient to support the general proposition, it is sufficient also to support the inference from particulars to particulars without passing through the general proposition. The inquirer who has logically satisfied himself that the condi-

m-m1117 [*not in* 62, 65, 68, 72]
n-n51 The reviewer comes much nearer to the gist of the question, when he objects

tions of legitimate induction were realized in the cases A, B, C, would be as much justified in concluding directly to the Duke of Wellington as in concluding to all men.[o] The general conclusion is [p]never[p] legitimate, unless the particular one would be so too; and in no sense, intelligible to me, can the particular conclusion be said to be drawn *from* the general one. [q] That the process of testing the sufficiency of an inductive inference is an operation of a general character, I readily concede to the reviewer; I had myself said as much, by laying down as a fundamental law, that whenever there is ground for drawing any conclusion at all from particular instances, there is ground for a *general* conclusion. But that this general conclusion should be actually drawn, however useful, cannot be an indispensable condition of the validity of the inference in the particular case. A man gives away sixpence by the same power by which he disposes of his whole fortune; but it is not necessary to the lawfulness of his doing the one, that he should formally assert, even to himself, his right to do the other.

The reviewer has recourse for an example, to syllogisms in the second figure (though all are, by a mere verbal transformation, reducible to the first), and asks, where is the *petitio principii* in this syllogism, "Every poet is a man of genius, A B is not a man of genius, therefore A B is not a poet?" It is true that in a syllogism of this particular type, the *petitio principii* is disguised. A B is not included in the terms, every poet. But the proposition, "Every poet is a man of genius," [r]supposing it to be provable[r], cannot have been inductively proved, unless the negative branch of the inquiry has been attended to as well as the positive; unless it has been fully considered whether among persons who are not "men of genius," there are not some who ought to be termed poets, and unless this has been determined in the negative. Therefore the case of A B has been decided by implication, as much as the case of Socrates in the first example. The proposition, Every poet is a man

[o-o]51 On this it may first be observed, that the formula does express all that takes place in ordinary unscientific reasoning. Mankind in general conclude at once from experience of death in past cases, to the expectation of it in future, without testing the experience by any principles of induction, or passing through any general proposition. This is not safe reasoning, but it *is* reasoning; and the syllogism, therefore, is not the universal type of reasoning, but only a form in which it is *desirable* that we should reason. But, in the second place, suppose that the enquirer does logically satisfy himself that the conditions of legitimate induction are realized in the cases A, B, C. It is still obvious, that if he knows the Duke of Wellington to be a man, he is as much justified in concluding at once that the Duke of Wellington is mortal, as in concluding that all men are mortal.

[p-p]51 not

[q]51 [*footnote:*] *The reviewer misunderstands me when he supposes me to say that "the conclusion must be admitted *before* we can admit the major premiss." [P. 20.] What I say is, that there must be ground for admitting it *simultaneously*, or else the major premiss is not proved.

[r-r]51 (a very questionable proposition, by the way)

of genius, is confessedly æquipollent with "No one who is not a man of genius is a poet," and in this the *petitio principii*, as regards A B, is no longer implied, but express, as in an ordinary syllogism of the first figure.

[s]The language of ratiocination would, I think, be brought into closer agreement with the real nature of the process, if the general propositions employed in reasoning, instead of being in the form All men are mortal, or Every man is mortal, were expressed in the form Any man is mortal. This mode of expression, exhibiting as the type of all reasoning from experience "The men A, B, C, &c. are so and so, therefore *any* man is so and so," would much better manifest the true idea—that inductive reasoning is always, at bottom, inference from particulars to particulars, and that the whole function of general propositions in reasoning, is to vouch for the legitimacy of such inferences.[sm]

[s-s]51 Another critic has endeavoured to get rid of the *petitio principii* in the syllogism by substituting for the common form of expression, the following form—All *known* men were mortal, Socrates is a man, therefore Socrates is mortal. To this, however, there is the fatal objection, that the syllogism, thus transformed, does not prove the conclusion; it wants not the form only, but the substance of proof. It is not merely because a thing is true in all *known* instances that it can be inferred to be true in any new instance: many things may be true of all known men which would not be true of all men; while, on the other hand, a thing may be superabundantly proved true of all men, without having been ascertained by actual experience to be true of all known men, or even of the hundredth part of them.

Appendix C

Book III, Chapter v ("Of the Law of Universal Causation"), §9, in MS, 1st (1843), and 2nd (1846) editions

[This section was replaced in the 3rd edition (1851) by the present §11 (§§5 and 10 being added in the 8th edition). The 1846 version is printed below, with variant notes giving the readings of the 1st edition and the MS.]

§9. [[a]*Doctrine that volition is an efficient cause, examined*[a]] Before concluding this chapter, it seems desirable to take notice of an apparent [b] opposition between the doctrines which I have laid down respecting causation, and those maintained in a work which I hold to be far the greatest yet produced on the Philosophy of the Sciences, M. Comte's *Cours de Philosophie Positive*. M. Comte asserts as his first principle, that the causes of phenomena are beyond the reach of the human faculties, and that all which is accessible to us is their *laws*, or, as he explains the term, their constant relations of succession or of similarity. Accordingly [c]he[c] sedulously abstains, [d]in the subsequent part of[d] his work, from the use of the word Cause: an example which I have not followed, for reasons which I will proceed to state. I most fully [e]subscribe to the doctrine[e] that *ultimate*, or, in the phraseology of metaphysicians, *efficient* causes, which are conceived as not being phenomena, [f]nor[f] perceptible by the senses at all, are radically inaccessible to the human faculties: and that the "constant relations of succession or of similarity" which exist among phenomena themselves, (not forgetting, so far as any constancy can be traced, their relations of coexistence,) are the only [g]subjects[g] of rational investigation. When I speak of causation, I have nothing in view, other than those constant relations: but I think the terms causation, and cause and effect, important to be preserved, for the purpose of distinctively designating one class of those relations, namely the relations of succession which so far as we know are unconditional; as contrasted with those which, like the succession of day and night, depend upon the existence

[a-a]MS, 43 *M. Comte's objections to the word Cause*
[b]MS, 43 , but not a real, [c-c]MS, 43 M. Comte [d-d]MS throughout
[e-e]MS, 43 agree with M. Comte [f-f]MS or [g-g]MS subject

or upon the coexistence of other antecedent facts. This distinction corresponds to the great division which Mr. Whewell and other writers have made of the field of science, into the investigation of what they term the Laws of Phenomena, and the investigation of causes;[*] a phraseology, as I conceive, [h]not philosophically sustainable[h], inasmuch as the ascertainment of causes, such causes as the human faculties *can* ascertain, namely causes which are themselves phenomena, is, therefore, merely the ascertainment of other and more universal Laws of Phenomena. And I cannot but look upon the revival, on English soil, of the doctrine (not only refuted by the school of Locke and Hume, but given up by their great rivals Reid and Stewart) that *efficient* causes are within the reach of human knowledge, as a remarkable instance of what has been aptly called "the peculiar zest which the spirit of reaction against modern tendencies gives to ancient absurdities."

Yet the distinction between those constant relations of succession or coexistence which Mr. Whewell terms Laws of Phenomena, and those which he terms, as I do, Laws of Causation, is grounded (however incorrectly expressed) upon a real difference. It is [i]only the extreme slightness of his acquaintance with M. Comte's speculations, which could have led Mr. Whewell to assume that he has overlooked this fundamental difference; and,[i] that by excluding the investigation of causes, he excludes that of all the most general truths [j], is a still more complete misapprehension.[j] But it does appear to me that his disinclination to employ the word Cause has occasionally led him to attach less importance than it deserves to [k]a[k] distinction, upon which alone, I am convinced, the possibility rests of framing a rigorous Canon of Induction. Nor do I see what is gained by avoiding this particular word, when M. Comte is forced, like other people, to speak continually of the *properties* of things, of *agents* and their *action*, of *forces* and the like; terms equally liable to perversion, and which are partial and inadequate expressions for what no word that we possess, except Cause, expresses in its full generality. I believe, too, that when the ideas which a word is commonly used to convey are overclouded with mysticism, the obscurity is not likely to be so effectually dispelled by abstaining from its employment, as by bringing out into full clearness the portion of real meaning which exists in the various cases where the term is most familiarly employed, and thereby giving a legitimate satisfaction to that demand of the intellect which has caused the term to remain in use.

[*Whewell, *Philosophy of the Inductive Sciences*, Vol. II, pp. 260ff.]

[h-h]MS, 43 altogether vicious

[i-i]MS, 43 no doubt with great injustice that Mr. Whewell (who has evidently given only a most partial and cursory inspection to M. Comte's work,) assumes that M. Comte has overlooked this fundamental distinction, and

[j-j]MS, 43 . No one really acquainted with M. Comte's admirable speculations could have so completely misapprehended their whole spirit and purport.

[k-k]MS, 43 this great

Appendix D

Portion of Book III, Chapter x ("Of Plurality of Causes; and of the Intermixture of Effects"), §4, in the 4th (1856) through 7th (1868) editions; with two papers on the Conservation of Force by Mill and Alexander Bain and supporting correspondence

[This passage first appeared in the 4th (1856) edition, and after considerable revisions, was deleted for the 8th edition (see 442[i]) and replaced by Book III, Chapter v ("Of the Law of Universal Causation"), §10, which should be read in conjunction with this Appendix (see also Mill's Preface to the 8th edition, cxvii above). The 1868 version is printed below, with variant notes giving the readings of the 4th, 5th, and 6th editions.

Given here as explicatory background are portions of the correspondence between Mill and Bain bearing on the matter in issue, the Conservation of Force, with two culminating papers that they exchanged. (Bain's letters and the two papers are in the Milton S. Eisenhower Library, Johns Hopkins University; the papers were printed, with some errors, in Hugh S. R. Elliot, ed., *The Letters of John Stuart Mill*, 2 vols. [London: Longmans, Green, 1910], II, 321–8. One letter in the sequence, Mill to Bain, 29 May, 1870, has not been located.) On the MS Mill dates his paper as "end of 1871," and Bain's as "February, 1872."]

[a]The very promising generalization now commonly known as the Conservation or Persistence of Force, bears a close resemblance to what the conception of chemical composition would become, if divested of the one circumstance which now distinguishes it from simple transformation. It has long been known that heat is capable of producing electricity, and electricity heat; that mechanical motion in numerous cases produces and is produced by them both; and so of all other physical forces. It has of late become the general belief of scientific inquirers[a] that mechanical force, electricity, mag-

[a–a]56, 62 Mr. Grove, in his *Correlation of Physical Forces*, one of the most suggestive, and most promising in future results, of all recent physical speculations, has

netism, heat, light, and chemical action (to which [b]has subsequently been added[b] vital [c]action[c]) are not so much causes of one another as convertible into one another; and [d]they are now generally spoken of as[d] forms of one and the same force, varying only in its [e] manifestations. [f]This doctrine may be admitted, without by any means implying that Force is a real entity, a Thing in itself, distinct from all its phenomenal manifestations to our organs. Supposing the doctrine true, the several kinds of phenomena which it identifies in respect of their origin would nevertheless remain different facts; facts which would be causes of one another—[f]reciprocally causes and effects, which is the first [g]element[g] in the form of causation properly called transformation. [h]What the doctrine contains more than this, is, that in each of these cases of reciprocal causation, the causes are reproduced without alteration in quantity. This is what takes place in the transformations of matter: when water has been converted into hydrogen and oxygen, these[h] can be reconverted into [i]precisely[i] the same quantity of water from which they were produced. To [j]establish a corresponding law in regard to Force, it has to be proved that heat is[j] capable of being converted into electricity, electricity into chemical action, chemical action into mechanical force, and mechanical force back again into the [k]exact[k] quantity of heat which was

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made a strong case for the hypothesis (for it is still no more than an hypothesis) of a relation among physical forces like that which exists between hydrogen and oxygen on the one hand and water on the other; or still more nearly resembling the mutual relation among those compound substances which consist of the same elements in the same proportions, but differ in their sensible properties, such as sugar, starch, and gum. It was known that heat is capable of producing electricity, and electricity heat, that mechanical motion in certain cases developes them both, and is produced by both, and so of the rest. Mr. Grove suggests

[b-b]56 Dr. Carpenter [*Principles of General Physiology*, pp. 7ff., 129ff.] adds

[c-c]56, 62 force

[d-d]56, 62 are all of them

[e]56, 62 outward

[f-f]56, 62 Such a doctrine might easily be mistaken for a piece of mystical metaphysics, professing to be a discovery of something relating to the ultimate essence of what we term Forces, considered as Things in themselves. But Mr. Grove sees clearly that such a pretension would be chimerical. His aim is sound and philosophical, and is expressed in a manner which wants but little of being philosophically unexceptionable. What it is pertinent here to remark is, that if his doctrine were established, the several kinds of phenomena which it professes to identify would still be causes of one another, and would be

[g-g]56, 62 ingredient

[h-h]56, 62 There is however another ingredient: when the cause has produced the effect, the effect must be capable of reproducing the cause without alteration in quantity. It is this second condition which is still wanting to convert Mr. Grove's hypothesis into a scientific theory. When water has been analysed into oxygen and hydrogen, the oxygen and hydrogen

[i-i]+65, 68

[j-j]56, 62 prove Mr. Grove's doctrine, heat should be

[k-k]56, 62 very same

[l]originally expended; and so through all the interchanges. Were this proved[l], it would establish what [m] constitutes transformation, as distinguished from the simple [n]fact[n] of reciprocal causation. [o]The fact in issue is simply the quantitative equivalence of all these natural agencies; whereby a given quantity of any one is convertible into, and interchangeable with, a given, and always the same, quantity of any other: this, no less, but also no more. It cannot yet be said that the law has been fully proved of any case, except that of interchange between heat and mechanical motion. It does seem to be ascertained, not only that these two are[o] convertible into [p]each[p] other, but that after any number of conversions the original quantities reappear without [q] addition or diminution [r], like the original quantities of hydrogen and oxygen after passing through the condition of water. If the same thing comes to be proved true of all the other forces, in relation to these two and to one another, the law of Conservation will be established; and it will be a legitimate mode of expressing the fact, to speak of Force, as we already speak of Matter, as indestructible. But Force will not the less remain, to the philosopher, a mere abstraction of the mind. All that will have been proved is, that in the phenomena of Nature, nothing actually ceases without generating a calculable, and always the same, quantity of some other natural phenomenon, which again, when it ceases, will in its turn either generate a calculable, and always the same, quantity of some third phenomenon, or reproduce the original quantity of the first.[r]

. . . .

Mill—Bain Correspondence

1. Mill to Bain

Avignon, May 17, 1870

. . . Respecting the Conservation theory itself, you have given [in your *Logic*] by many degrees the clearest explanation of it that I have ever met

[l-l]56, 62 expended at the commencement of the series. Were this proved to be the fact

[m]56, 62 exactly [n-n]56, 62 case

[o-o]56, 62 But until this is proved, the facts and arguments so instructively brought together by Mr. Grove, are only valid as a presumption (though a very strong one) that this quantitative equivalence of the various forms of force really exists. To call the forces identical implies that they are not only

[p-p]56, 62 one [q]56, 62 either

[r-r]56 : as they do in all the chemical conversions and reconversions of the same portions of matter.] 62 *as* 56 . . . matter; and this doctrine, which regards Force as equally indestructible with matter, seems, under the name of the Conservation of Force, to be gradually passing from the state of an hypothesis into that of a philosophical tenet. But it is still very far from having attained the position of an established truth.

with, & I now seem to myself to understand the *facts* of the case pretty completely. But about the mode of expression of the facts I still boggle, & have a stronger impression after reading your exposition than I had before that the men of science have not yet hit upon the correct generalization though they may be at no great distance from it. I am so anxious to understand this matter thoroughly that I write down my difficulties in hopes that you will help me to resolve them.

In the first place, you exclude from the theory two of the principal forces, Gravitation & Molecular Adhesion, expressly distinguishing these from the "correlated forces." Of course you do so because there is at present no proof of the convertibility of the other forces into these; & you do not take any notice of the hypothetical explanation of gravitation by molecular motions, given by Tait (I believe) & others, which so strikingly resemble the argument of Descartes to shew that his vortices might generate a tendency to a centre. But though gravity does not take its place in the theorem of conservation, motion generated by gravity does. Suppose, then, a weight suspended by a string over the shaft of a mine—suppose that the string breaks, & the weight falls, with rapidly increasing velocity, to the bottom. Here is a positive addition to the active force at work in the universe, which, when it ceases its mechanical motion, remains in the form of heat or in some other of the correlated forms. Now, at the expense of what pre-existing energy has this force been generated? The conservationists are obliged to say, out of potential energy. A given quantity of potential energy has become actual; & if the weight is hoisted up again the power expended in raising it is so much taken back from the sum of actual energy & restored to the sum of potential.

Now I want to analyse the meaning of this phrase, "potential energy." It seems to signify some force actually residing in the suspended weight. But it is nothing of the kind. There *is* a force actually residing in the weight; a force exactly measurable: viz. the downward pressure with which it pulls at the string, & by which it is able to neutralise an equal weight at the other end of a lever. But this force is limited to that with which the body would commence falling if the string broke, & is far short of the vastly accelerated force with which it would reach the bottom of the mine. When we are bid to say that this augmented force existed previously as potential energy in the weight, this potential energy is not to common sense & logic anything which really existed, but is a mere name for our knowledge that a force *would* be created if the body began to fall.

I am discussing the expressions, not denying any of the facts. I admit that when force is expended in placing a weight in a "more advantageous position," as you express it (i.e. in a place from which it has further to fall in order to reach its centre of attraction) when it does fall to the depth from which it has been raised it will reproduce the exact amount of force expended in raising it (making allowance for any part which may have been trans-

formed into heat). The expression "potential energy" is no doubt adopted to enable us to say that the total amount of force in all Nature can neither be increased nor diminished, the sum of the actual force plus the sum of the potential being a constant quantity. But this only means that there is a vast reserve of force not existing in any shape now, but which gravity could call into existence, & that this not actual but possible quantity of force has an extreme limit, viz. the whole of the motion that would be generated by the rushing together of all the gravitating bodies in the universe until they could not possibly get any closer together. From time to time a little of this possible force gets itself created & in that case it requires that an equal force sh[d] be expended if the effects produced are to be counterbalanced or undone.

It seems to me a bad & misleading form of expression to ascribe the motion which would be gradually acquired by gravitating bodies if the obstacles which keep them apart were removed, to an energy of equivalent amount residing in the body before it begins to move.

But if this objection could be overruled a greater remains behind. You say (& this is a point quite new to me) that force may be, & is, expended in merely altering the collocation of bodies, without generating even potential energy. This I suppose is the case when force is expended in destroying molecular adhesion. But if this be so, how can the indestructibility of force be maintained? The sum of actual force plus the sum of potential is, in that case diminished.

When you have time, perhaps you will kindly explain to me how the theory of Conservation as at present expressed, can stand with this fact. . . .

. . . .

2. Bain to Mill

Inverurie, by Aberdeen, 19 July, 1870

. . . You have conceived the position of gravity, in the correlated forces, so exactly, that I can hardly add anything to your statement of the facts. And having the facts so clearly before you, you are as well able as any one else is, to say how the state of the case may be best expressed in language. If we were to exclude gravity (and cohesion) from the Universe, force would exist purely as *actual* motion, mechanical and molecular. There would be so much momentum of moving masses, and so much of moving molecules, as Heat, &c. The law of transference would hold strictly; and the mode of transference would always be from one moving mass to another. This would be Correlation in its purity and simplicity. But now the existence of gravity, and other attractive (as well as repulsive) forces, introduces a new aspect, whereby we may have the reality of force, without the fact of the actual movement of

masses or molecules. The principle of equivalence still holds; and the existence of these attractions and repulsions neither create nor destroy the total of available force. They alter its direction, and they embody it in a form, that we should *a priori* have supposed impossible,—the form of absolute quiescence. These influences are not a *primal* source of moving power; although to appearances, and on the prevailing cosmical hypothesis, gravity is *de facto* the source of all the energies of our solar system. But gravity, in this sense, must be conceived as disgorging energy, namely, all that energy that was expended in separating the masses to the distance at which they begin to gravitate towards each other. Hence the force of gravity is termed *potential*, and also energy of *position*, because it may be without actual motion, and is inoperative until such time as the masses are separated by the consumption of other force.

These are merely a few varieties of expression of the broad facts. What is true of gravity applies to molecular adhesion, as in a spring, which is an equally familiar instance of an agency that can neither create nor destroy power, but may store up, and divert it; having the same peculiarity of embodying the power without *actual* movement, of either mass or molecule.

Your other difficulty can be resolved thus. Notwithstanding the absolute indestructibility of force, there is one situation where it is transmuted with remarkable facility into a form wherein it is practically useless; that is to say, the radiation of heat into (so-called) empty space. By a circumstance, which has often struck me as the most frightful act of prodigal waste within the whole compass of human knowledge, and sufficient of itself to damn any one pretending to be the Creator, nearly the whole of the accumulated energy of the sun, is passing off into the realms of boundless space, merely raising the temperature of space by an infinitesimal amount, such as to be of no value to any interest that we can conceive. Now what happens in the great scale of the sun's unintercepted radiation, happens in the small scale, on many petty occasions. Suppose a block of granite dragged over a level space. The force expended upon the act would of course, in free space, impart a persisting momentum to the block. But all this momentum is destroyed by the friction of the ground; that is, an equivalent amount of heat, as rise of temperature, is generated in the surface passed over. In certain circumstances, the heat would continue, and would represent in all future time the momentum expended. But in actual fact, the heat soon radiates off into free space, there to join the waste radiation of all suns and stars, by which ultimately all the force in the universe must be dissipated beyond recall, without being in strict language annihilated.

It is true that my use of the word "Eliminate" passes beyond the mathematical signification. We need a word to express the act of separating the casual from the causal antecedents of a phenomenon. Now the word "elimin-

ate" has already made one step in chemical physiology, where it signifies the extrication or separation of various products as carbonic acid, urea, &c by means of the lungs, kidney, and so forth. And, although it may be a farther stretch, to use it for the inductive problem, no better word occurred to me. The operation being a technical one seems to want a technical word. . . .

. . . .

3. Mill to Bain

Blackheath Park, Aug. 4, 1870

. . . I am much obliged to you for your letter which though it does not remove my difficulties affords material which may perhaps help me towards resolving them.

How do we know that any energy has ever been expended in "separating the masses to the distance at which they begin to gravitate towards each other"? The new theory of the universe in relation to Force shews the same tendency from all past time to draw the masses nearer to one another instead of separating them, to which it is supposed that the present order of the universe will finally succumb. If by the masses are meant the molecules, & if what you say refers to the separation into different stellar bodies by cooling, of what was originally a nebula; I would say that the molecules of the nebula must have already gravitated towards one another. If they were ever too close together to do so, how have they ever emerged from that state? I cannot see what preexisting force can have been hoarded by gravitation.

"Elimination" in the chemical application which you mention, still seems to mean only *getting rid of*, and not picking out & retaining. . . .

. . . .

4. Bain to Mill

Inverurie, Aberdeen, Aug. 16, 1970

. . . The only answer to your difficulty as to the separation of gravitating bodies is that both theoretically, and in fact, a collision between two bodies, converts mechanical force into heat, which is expansive energy, and leads to the separation of a compact solid mass into a diffused aenal mass, which gravitation brings together again. The fall of another earth towards ours, under gravity, is calculated as discharging an amount of force that would vaporise the entire mass; and ages would be occupied in its re-consolidation. This is the only known mode of regenerating extinct solar systems.

There is a volume edited by Dr. Youmans, an American, containing the whole series of essays on the correlation of force.[*] Some of them you have read, others are now past; but one or two would still be of use by suggesting illustrations and points of view. There is one by Mayer, and I think one by Helmholtz, which although out a good many years, have not been exhausted of their interest. I can send you my copy if the book is not in the London Library. . . .

. . . .

Papers on the Conservation of Force

Mill's Paper

1. *Potential Energy.*

It appears to me that this is a misnomer, and that it produces unnecessary obscurity in the theory of the Conservation of Force. The theory being that all force consists in motion, either molar or molecular, & that motion is neither created nor destroyed but only transferred, it seems as if the force said to be laid up (for instance) in the coal were a contradiction to the theory, unless one supposes that an undiminished quantity of molecular motion continues to take place in the coal during the whole interval between its first deposition & its extrication, & in that case one does not see why it shd not produce heat. This difficulty is cleared up by the consideration that what is really potential is the motion. The motion, or other phenomenon interchangeable with motion, which caused the formation of the coal, has not been stored up, but has ceased & been annihilated: but the coal which has been generated will, under suitable allocations, reproduce a quantity of motion or other equivalent phenomenon, which quantity not being indefinite, but exactly equal to the quantity previously expended, justifies the expression that a definite quantity of force has been stored up. Force, therefore, must be defined not as real motion, no more than as an occult cause of motion, but as a potentiality or permanent possibility of motion, just as matter is a permanent possibility of sensation. Hence it is not proper to speak of potential force, or potential energy. Potential means (*vide* Hamilton) that which is not, but may be: but the energy *is*; that which sometimes is not, but always may be, is the motion itself: & instead of speaking of potential energy, we should define the energy itself as potential motion.

[*E. L. Youmans, ed. *The Correlation and Conservation of Forces: a series of expositions.* New York: Appleton, 1865.]

2. *Gravitation.*

The interchangeability, in the case of gravitation, of force not merely with other forms of force but with what is called a "position of advantage," is a great puzzle, & seems to be so far a surrender of the theory of Conservation of Force. For the purpose of saving the theory it is denied that gravity creates any force, & even Mr. Bain accepts this doctrine, giving as the ground of it that "what is gained in power is lost in position; to restore the position would require the power to be given back." But surely this is merely the equivalent of what is true of all force. The force expended in chemical decomposition is restored in recomposition; & the power must be given back to replace things as they were before. The heat given out in freezing must be restored in melting. It seems to me that what requires force to overcome it must be allowed to be force. This difficulty however is removed by the change of language I have proposed. We should then say as is usually said, that a stationary body resting on the earth exerts a present force equal to its weight; but besides an actual moving power equal to that of the weight necessary to balance it, it has a latent potentiality of motion equal to the whole of the motion which it would go through if it, with the whole earth, were to fall into the sun. Now when this body is lifted or thrown up to a higher position & remains there, it has added to its former potentiality of motion, in the direction of gravity, a quantity equal to the additional motion which it would have to perform in first falling back to its original position; & this quantity is exactly equal to the quantity of force which was expended in raising it. We may therefore say, without impropriety, that this amount of energy has not perished, but has been stored up in the body by the fact of elevating its position.

3. *Light.*

I do not see the difficulty which others appear to see in the relation of light to the theory of Conservation. I do not see why that theory should make us expect that when a body by heating becomes luminous the light should be produced at the expense of heat. It ought to be so if light were itself a force; but my solution would be that light, like the *sensation* of heat, is purely subjective: what is objective, if the theory be true, is the vibrations of the medium. Now though there are vibrations which produce only heat, or only chemical action, there are, if I remember right, none which produce only light; all the rays of the spectrum are I believe also calorific, though in unequal degrees. I shd therefore surmise that light is merely a concomitant, due to a physiological action of those vibrations, & that the chemical influence said to be exerted by light is really exerted by the vibrations themselves. Any other supposition seems inconsistent with the fact that there are rays, not luminous, which produce the chemical effect in a still higher degree than those which are luminous. Then, when a body is heated to luminousness,

there would be an increased extrication of the form of force which is represented by heat, but no transmutation of any of it into another form represented by light; the sensation of light would be merely an incidental effect on our optic nerve of the increased vibratory motion in the medium, & there would be no expenditure of force except what takes place at the transition from the ether to the optic nerve, which would be parallel with the similar expenditure of force that there must be in putting our nerves into the condition which gives the sensation of heat.

4. *Force expended without result.*

Here seems still to lurk the only real imperfection of the theory. It appears that force expended in altering the mere allocations of objects, as in moving stones from the quarry to the place where they are to be used, is wholly lost, no potentiality of reproducing equivalent motion being stored up. If this be so, then, according to the theory, the quantity of force in the universe must be constantly diminishing, since every change in the position of objects consumes some of it, &, unless when a "position of greater advantage" has been obtained, none is reproduced. This is a more serious matter than even the dissipation of energy by the solar radiation into space, since that is a transfer of the force to the interstellar ether from which for aught we know it may be capable of being again collected about points. But if the Conservation theory be true ought not the force expended in altering allocations to be still preserved in a similar manner to the force radiated from the sun, viz by being transferred to the ether? As a matter of fact is not much of it converted into heat? I shd much like to know what scientific authorities would say to this.

5. *Attraction & Repulsion.*

There still remain many questions, which may or may not have been settled, respecting the application of the Conservation of Force to those internal forces by which bodies are supposed to be held in their existing state, viz. molecular attractions & repulsions balancing one another. Here is apparently a vast store of potential motion, prevented from being actual by opposite potentialities. Is this store of latent force also derived from the Sun? & if so how? When air is condensed by pressure heat is evolved. Is this heat a numerical equivalent of the motion, real or potential, which is expended? Take off all pressure, & the particles of the air fly apart, until they are stopped by gravity: the expansive force I suppose is the force which was stored up in the air; but then air, in rarifying, absorbs a great quantity of heat. What is the explanation of this phenomenon by the Conservation of Force? It is not that the heat is transformed into expansive motion, as when heat applied to water converts it into elastic steam: on the contrary, the expansion comes first, & the absorption follows as its effect just as if a vacuum had been made

in the ocean of force & other force rushed in to fill it; but this is not a transformation of force. I do not know whether these questions have been resolved, or what are the exact relations between the theorem of the Persistence of Force & these particular kinds of molecular action.

Bain's Paper

The phrase, Potential Energy, must not be too closely criticised. It covers a gap that at present we know not how to fill up. The difficulty does not occur in regard to the molecular force of chemical action, although the phrase is used for that case. The force supposed to be stored up in coal is not potential, but real movement existing in the Oxygen. As compared with Carbonic Acid, Oxygen contains in the shape of the high molecular movement all the force given out in combustion; and the lowered condition of molecular force in Carbonic Acid expresses the amount of change.

It is with gravity that the real difficulty occurs, in finding the suitable expression of equivalence. When force is expended to raise a body against gravity, we know only that the body on falling again would acquire the force equal to what had been expended, but we are unable to assign any molecular movement which represents the force expended, when the body has attained its height. If gravity could be explained in the form of some ethereal action of the intervening medium, doubtless the agitation of such a medium might be a molecular equivalent for the force expended in raising a body against gravity. But as this seems to be a hopeless attempt, we must just express the fact as we find it, and allow a break in the continuity of molecular and molar movement as respects force.

Another case very much resembling gravity is the action of a spring, which is the case of attraction or repulsion in the small scale of molecules. This is equally heterogeneous with the idea of matter in motion as representing the type of force. At the present moment we must treat these attractions and repulsions exactly like gravity as a break in the line of force considered as matter in motion. A distended spring is a position to attain which force is expended, and the recovery from which by molecular attraction restores the force into moving matter. But we cannot say that the tension of the spring is itself moving matter.

In the case of the transference of bodies from one place to another, the force consumed all turns to radiant heat through the medium of friction or of collision. A heavy body set in motion would of course move for ever, and retain the force expended on it. It would go through space, and might be found, as it were, at all distances without any waste. That is the very nature of motion to treat space and distance as nothing. But now, if we wish to arrest and to localize this body, we must apply a counter force to stop it. This

counter force might be another body free to move, and to take on the equivalent momentum, so that nothing would be lost. But, in point of fact, we oppose bodies in motion by a dead obstacle, or a drag, which converts all the movement into sensible heat, raises the temperature of bodies, and, consequently, in cooling all the heat and force are wasted by the usual mode of ultimate dissipation.

As to the question of light. The subjective aspect of the phenomenon does not exhaust its bearings. We must view light as well as heat both on the objective and on the subjective sides. Objectively, heat is supposed to be a mode of molecular motion capable of imparting motion molar or molecular at a definite rate of commutation. The difficulty lies in making good the same fact regarding light. No amount of mere light has ever yet been transformed into force in any of the other modes: yet light plays a part in the disturbance of molecular equilibrium. It is the occasion of combinations and of decompositions as in the well-known facts culminating in Photography. As causing combination it displays no molecular force in the sense of imparting a definite quantity of its own to another body. It merely puts the particles in a position to bring their own forces into play, and to begin a molecular change in the bodies combined. A mechanical disturbance and many other things would have the very same efficacy. The testing case of the transference of power is chemical decomposition. Heat is a decomposing agent because it can supply, or restore, the molecular power that was given forth when the elements first combined. Light is incapable of this. If it ever causes decomposition, it is in the presence of some other power that supplies the needful molecular force that was given out in the previous combination. The action of light upon the retina is apparently of this disturbing kind, and its great efficiency is due to the extreme instability of nervous matter.

The change of phrase from Potential Energy to Potential Motion is certainly an improvement, in respect of exchanging the vague word "Energy" for the definite fact "Motion", which is the word that is supposed to generalize, and, at the same time, embody the fact called "Energy" and "force". The gain of the new theory is from never losing sight of the "moving matter" as the cardinal circumstance, and the true meaning of what we call "force", "Energy", "power", and the like.

Appendix E

Book III, Chapter xiii ("Miscellaneous Examples of the Explanation of Laws of Nature") §§1–3, in MS, and 1st (1843) through 5th (1862) editions

[These sections were replaced in the 6th edition (1865) by the present §§1–3. The 1862 version is printed below, with variants to the earlier editions and the MS.]

§ 1. [*Liebig's theory of the contagiousness of chemical action*] Some of the most remarkable instances which have occurred since the great Newtonian generalization, of the explanation of laws of causation subsisting among complex phenomena, by resolving them into simpler and more general laws, are to be found among the [a] speculations of Liebig in organic chemistry. These speculations, though they have not yet been sufficiently long before the world to entitle us positively to assume that no well-grounded objection can be made to any part of them, afford, however, so admirable an example of the spirit of the Deductive Method, that I may be permitted to present some specimens of them here.

It has been observed in certain cases, that chemical action is, as it were, contagious; that is to say, a substance which would not of itself yield to a particular chemical attraction, (the force of the attraction not being sufficient to overcome cohesion, or to destroy some chemical combination in which the substance was already held,) will nevertheless do so if placed in contact with some other body which is in the act of yielding to the same force. Nitric acid, for example, does not dissolve pure platinum, which may "be boiled with this acid without being oxidized by it, even when in a state of such fine division that it no longer reflects light."[*] But the same acid easily dissolves silver. Now if an alloy of silver and platinum be treated with nitric acid, the acid does not, as might naturally be expected, separate the two metals, dis-

[*Liebig, *Organic Chemistry*, pp. 220–1.]

[a]MS, 43, 46 recent

solving the silver, and leaving the platinum; it dissolves both: the platinum as well as the silver becomes oxidized, and in that state combines with the undecomposed portion of the acid. In like manner, "copper does not decompose water, even when boiled in dilute sulphuric acid; but an alloy of copper, zinc, and nickel, dissolves easily in this acid with evolution of hydrogen gas."[*] These phenomena cannot be explained by the laws of what is termed chemical affinity. They point to a peculiar law, by which the oxidation which one body suffers, causes another, in contact with it, to submit to the same change. And not only chemical composition, but chemical decomposition, is capable of being similarly propagated. The peroxide of hydrogen, a compound formed by hydrogen with a greater [b]amount[b] of oxygen than the quantity necessary to form water, is held together by a chemical attraction of so weak a nature, that the slightest circumstance is sufficient to decompose it; and it even, though very slowly, gives off oxygen and is reduced to water spontaneously (being, I presume, decomposed by the tendency of its oxygen to absorb heat and assume the gaseous state). Now it has been observed, that if this decomposition of the peroxide of hydrogen takes place in contact with some metallic oxides, as those of silver, and the peroxides of lead and manganese, it superinduces a corresponding chemical action upon those substances; they also give forth the whole or a portion of their oxygen, and are reduced to the metal or to the protoxide; though they do not undergo this change spontaneously, and there is no chemical affinity at work to make them do so. Other similar phenomena are mentioned by [c] Liebig. "[d]No[d] other explanation," he observes, "of these phenomena can be given, than that a body in the act of combination or decomposition enables another body, with which it is in contact, to enter into the same state."[†]

Here, therefore, is a law of nature of great simplicity, but which, owing to the extremely special and limited character of the phenomena in which alone it can be detected experimentally (because in them alone its results are not intermixed and blended with those of other laws), had been very little recognised by chemists, and no one could have ventured, on experimental evidence, to affirm it as a law common to all chemical action; owing to the impossibility of a rigorous employment of the Method of Difference where the properties of different kinds of substance are involved, an impossibility [e] noticed and characterized in a previous chapter.* Now this [f]extremely[f] special and apparently precarious generalization has, in the hands of Liebig,

[**Ibid.*, p. 221.]
[†*Ibid.*, p. 225.]
*Supra, pp. 409–10.

[b–b]MS quantity
[c]MS, 43 Dr.
[d–d]Source, MS, 43, 46, 51 Now no
[e]MS, 43, 46, 51 which we
[f–f]MS very

been converted, by a masterly employment of the Deductive Method, into a law pervading all nature, in the same way as gravitation assumed that character in the hands of Newton; and has been found to explain, in the most unexpected manner, numerous detached generalizations of a more limited kind, reducing the phenomena concerned in those generalizations into mere cases of itself.

The contagious influence of chemical action is not a powerful force, and [g]is[g] only capable of overcoming weak affinities: we may, therefore, expect to find it principally exemplified in the decomposition of substances which are held together by weak chemical forces. Now the force which holds a compound substance together is generally weaker, the more compound the substance is; and organic products are the most compound substances known, those which have the most complex atomic constitution. It is, therefore, upon such substances that the self-propagating power of chemical action is likely to exert itself in the most marked manner. Accordingly, first, it explains the remarkable laws of fermentation, and some of those of putrefaction. "A little leaven," that is, dough in a certain state of chemical action, impresses a similar chemical action upon "the whole lump."[*] The contact of any decaying substance, occasions the decay of matter previously sound. Again, yeast is a substance actually in a process of decomposition from the action of air and water, evolving carbonic acid gas. Sugar is a substance which, from the complexity of its composition, has no great energy of coherence in its existing form, and is capable of being easily converted (by combination with the elements of water) into carbonic acid and alcohol. Now the mere presence of yeast, the mere proximity of a substance of which the elements are separating from each other, and combining with the elements of water, causes [h] sugar to undergo the same change, giving out carbonic acid gas, and becoming alcohol. It is not the elements contained in the yeast which do this. "An aqueous infusion of yeast may be mixed with a solution of sugar, and preserved in vessels from which the air is excluded, without either experiencing the slightest change."[†] Neither does the insoluble residue of the yeast, after being treated with water, possess the power of exciting fermentation. [i](Here we have the Method of Difference.)[i] It is not the yeast itself, therefore; it is the yeast in a state of decomposition. The sugar, which would not decompose and oxidize by the mere presence of oxygen and water, is induced to do so when another oxidation is at work in the midst of it.

By the same principle Liebig is enabled to explain [j]many cases of[j] malaria;

[*Galatians, 5:9; cf. I Corinthians, 5:6. For Liebig's comparable passage, see *Organic Chemistry*, p. 231.]

[†*Organic Chemistry*, p. 253.]

[g-g]+43, 46, 51, 56, 62
[h]MS the
[i-i]+51, 56, 62
[j-j]+46, 51, 56, 62

the pernicious influence of putrid substances; a variety of poisons; contagious diseases; and other phenomena.[*] Of all substances, those composing the animal body are the most complex in their composition, and [k]are[k] in the least stable condition of union. The blood, in particular, is the most unstable compound known. [l]It is, therefore, not surprising[l] that gaseous or other substances, in the act of undergoing the chemical changes which constitute, for instance, putrefaction, should, when brought into contact with the tissues by respiration or otherwise, and still more when introduced by inoculation into the blood itself, impress upon some of the particles a chemical action similar to its own; which is propagated in like manner to other particles, until the whole system is placed in a state of chemical action more or less inconsistent with the chemical conditions of vitality.

Of the three modes in which we observed in the last chapter that the resolution of a special law into more general ones may take place, this speculation [m] exemplifies the second. The laws explained are such as this, that yeast puts sugar into a state of fermentation. Between the remote cause, the presence of yeast, and the consequent fermentation of the sugar, there has been interpolated a proximate cause, the chemical action between the particles of the yeast and the elements of air and water. The special law is thus resolved into two others, more general than itself: the first, that yeast is decomposed by the presence of air and water; the second, that matter undergoing chemical action has a tendency to produce similar chemical action in other matter in contact with it. But while the investigation thus aptly exhibits the second mode of the resolution of a complex law, it no less happily exemplifies the third; the subsumption of special laws under a more general law, by gathering them up into one more comprehensive expression which includes them all. For the curious fact of the contagious nature of chemical action [n]is[n] only raised into a law of *all* chemical action by these very investigations: just as the Newtonian attraction was only recognised as a law of all matter when it was found to explain the phenomena of terrestrial gravity. Previously to Liebig's investigations, the property in question had only been observed in a few special cases of chemical action; but when his deductive reasonings [o]have[o] established that innumerable effects produced upon weak compounds, by substances none of whose known peculiarities would account for their having such a power, might be explained by considering the supposed special property to exist in all those cases, [p]these numerous generalizations on

[*See *ibid.*, pp. 329 ff.]

[k–k]+51, 56, 62
[l–l]MS, 43, 46 What, therefore, can be less surprising than
[m]MS, 43 of Liebig [n–n]MS, 43, 46 was [o–o]MS, 43, 46 had
[p–p]MS we bring together these numerous generalizations on separate substances, into one general law of chemical action itself

separate substances [q]are[q] brought together into one law of chemical action in general[p]: the peculiarities of the various substances being, in fact, eliminated, just as the Newtonian deduction eliminated from the instances of terrestrial gravity the circumstance of proximity to the earth.

§ 2. [*Liebig's theory of respiration*] Another "speculation of the same chemist[a], which, if it should ultimately be found to agree with all the facts of the extremely complicated phenomenon to which it relates, will constitute one of the finest examples of the Deductive Method on record, is his theory of respiration.[*]

The facts of respiration, or in other words the special laws which [b]it is[b] attempted to explain from, and resolve into, more general ones, are, that the blood in passing through the lungs absorbs oxygen and gives out carbonic acid gas, changing thereby its colour from a blackish purple to a brilliant red. The absorption and exhalation are evidently chemical phenomena; and the carbon of the carbonic acid must have been derived from the body, that is, must have been absorbed by the blood from the substances with which it came into contact in its passage through the organism. [c]It is required[c] to find the intermediate links—the precise nature of the two chemical actions which take place; first, the absorption of the carbon or of the carbonic acid by the blood, in its circulation through the body; next, the excretion of the carbon, or the exchange of the carbonic acid for oxygen, in its passage through the lungs.

Dr. Liebig believes himself to have found the solution of this *vexata quæstio* in a class of chemical actions in which scarcely any less acute and [d]penetrating[d] inquirer would have thought of looking for it.

Blood is composed of two parts, the serum and the globules. The serum absorbs and holds in solution carbonic acid in great quantity, but has no tendency either to part with it or to absorb oxygen [e]. The globules, therefore, are concluded to be the portion of the blood which is operative in respiration. These globules contain a [f]certain quantity of iron, which from[f] chemical tests is inferred to be in the state of oxide.

Dr. Liebig recognised, in the known chemical properties of the oxides of iron, laws which, if followed out deductively, would lead to the prediction of the precise series of phenomena which respiration exhibits.

[*Justus von Liebig. *Animal Chemistry, or Organic Chemistry in its Applications to Physiology and Pathology*. Ed. William Gregory. London: Taylor and Walton, 1842, pp. 265 ff.]

[q-q]43, 46 were
[a-a]MS, 43 of Liebig's speculations
[b-b]MS, 43 Liebig has
[c-c]MS, 43, 46, 51 Required
[d-d]MS, 43 accurate
[e]MS : the globules have
[f-f]MS considerable quantity of iron, which from certain

There are two oxides of iron, a protoxide and a peroxide. [g]In the arterial blood the iron is in the form of peroxide: in the venous blood we have no direct evidence which of the oxides is present, but the considerations to be presently stated [h]lead to the conclusion[h] that it is the protoxide.[g] As arterial and venous blood are in a perpetual state of alternate conversion into one another, the question arises, [i]in[i] what circumstances the protoxide of iron is capable of being converted into the peroxide, and *vice versâ*. Now the protoxide readily combines with oxygen in the presence of water, forming the hydrated peroxide: these conditions it finds in passing through the lungs; it derives oxygen from the air, [j]and finds water in the blood itself. This would already explain one portion of the phenomena of respiration.[j] But the arterial blood, in quitting the lungs, is charged with hydrated peroxide: in what manner is the peroxide brought back to its former state?

The chemical conditions for the reduction of the hydrated peroxide into the state of protoxide, are precisely those which the blood meets with in circulating through the body; namely, contact with organic compounds.

Hydrated peroxide of iron, when treated with organic compounds (where no sulphur is present) gives forth oxygen and water, which oxygen, attracting the carbon from the organic substance, becomes carbonic acid; while the peroxide, being reduced to the state of protoxide, combines with the carbonic acid, and becomes a carbonate. Now this carbonate needs only come again into contact with oxygen and water to be decomposed; the carbonic acid being given off, and the protoxide, by the absorption of oxygen and water, becoming again the hydrated peroxide.

The mysterious chemical phenomena connected with respiration can [k]thus[k], by a beautiful deductive process, be completely explained. The arterial blood, containing iron in the form of hydrated peroxide, passes into the capillaries, where it meets with the decaying tissues, receiving also in its course certain non-azotised but highly carbonised animal products, in particular the bile. In these it finds the precise conditions required for decomposing the peroxide into oxygen and the protoxide. The oxygen combines with the carbon of the decaying tissues, and forms carbonic acid, which, though insufficient in amount to neutralize the whole of the protoxide, combines with a portion [l](one-fourth) of it,[l] and returns in the form of a carbonate, along

[g–g]MS The protoxide is black, the peroxide red; & it being almost certain that iron is the principal colouring matter of the blood, this already indicates that the venous blood contains the iron chiefly in the form of protoxide, the arterial, in that of peroxide.

[h–h]43, 46 will prove

[i–i]MS, 43, 46 under

[j–j]MS water from the blood itself. One portion of the phenomena of respiration is thus accounted for.

[k–k]MS, 43, 46, 51 now

[l–l]MS of it (about one fourth according to Liebig)

with the other three-fourths of the protoxide, [m] through the venous system into the lungs. There it again meets with oxygen and water: the free protoxide becomes hydrated peroxide: the carbonate of protoxide parts with its carbonic acid, and by absorbing oxygen and water, enters also into the state of hydrated peroxide. The heat evolved in the transition from protoxide to peroxide, as well as in the previous oxidation of the carbon contained in the tissues, is considered by Liebig as the cause which sustains the temperature of the body. But into this portion of the speculation we need not enter.*

This example displays the second mode of resolving complex laws, by the interpolation of intermediate links in the chain of causation; and some of the steps of the deduction exhibit cases of the first mode, that which infers the joint effect of two or more causes from their separate effects; but to trace out in detail these exemplifications may be left to the intelligence of the reader. The third mode is not employed in this example, since the simpler laws into which those of respiration are resolved (the laws of the chemical action of the oxides of iron) were [r]laws already known, and do[r] not acquire any additional generality from their employment in the present case.

§ 3. [*Other [a]chemical speculations[a]*] [b]The property which salt possesses of preserving animal substances from putrefaction is [c]resolved by Liebig[c] into two more general laws, the strong attraction of salt for water, and the necessity of the presence of water as a condition of putrefaction.[*] The intermediate phenomenon which is interpolated between the remote cause and the effect, can here be not merely inferred but seen; for it is a familiar fact, that flesh upon which salt has been thrown is speedily found swimming in brine.

*As corroborating the opinion [n] that the protoxide of iron in the venous blood is only partially carbonated, the fact has been suggested, that the system shows great readiness to absorb an extra quantity of carbonic acid, as furnished in effervescing drinks. In such cases the acid must combine with something, and that something is [o]not improbably[o] the free protoxide. It would be worth ascertaining whether the protoxide itself, or its carbonate, has the [p]greatest[p] facility in absorbing oxygen and turning itself into hydrated peroxide in the lungs. If the carbonate, then the beneficial effect, on the animal economy, of drinks which give an artificial supply of carbonic acid to the system, would be, to that extent, deductively [q]established[q].

[*See *Organic Chemistry*, pp. 333–4.]

[m]MS in the now blackened blood,
[n]MS, 43 of Liebig
[o–o]MS, 43, 46 probably
[p–p]MS, 43, 46 greater
[q–q]MS, 43 demonstrated
[r–r]MS, 43, 46 already known laws, and did
[a–a]MS, 43 *speculations of Liebig*
[b–b]65, 68, 72 [*in* §2; *see* 475[a–a] *above*]
[c–c]46 resolved [*cf.* 475[b–b] *above*]

The second of the two factors (as they may be termed) into which the preceding law has been resolved, the necessity of water to putrefaction, itself affords an additional example of the Resolution of Laws. The law itself is proved by the Method of Difference, since flesh completely dried and kept in a dry atmosphere does not putrefy, as we see in the case of dried provisions, and human bodies in very dry climates. A deductive explanation of this same law results from Liebig's speculations. The putrefaction of animal and other azotised bodies is a chemical process, by which they are gradually dissipated in a gaseous form, chiefly in that of carbonic acid and ammonia; now to convert the carbon of the animal substance into carbonic acid requires oxygen, and to convert the azote into ammonia requires hydrogen, which are the elements of water. The extreme rapidity of the putrefaction of azotised substances, compared with the gradual decay of non-azotised bodies (such as wood and the like) by the action of oxygen alone, [d]he explains[d] from the general law that substances are much more easily decomposed by the action of two different affinities upon two of their elements, than by the action of only one.[b]

The purgative effect of salts with alkaline bases, when administered in concentrated solutions, is explained [e] from the two following principles: Animal tissues (such as the stomach) do *not* absorb concentrated solutions of alkaline salts; and such solutions *do* dissolve the solids contained in the intestines. The simpler laws into which the complex law is here resolved, are the second of the two foregoing principles, combined with a third, namely, that the peristaltic contraction acts easily upon substances in a state of solution. The negative general proposition, that animal substances do not absorb these salts, contributes to the explanation by accounting for the absence [f] of a counteracting cause, namely, absorption by the stomach; which in the case of other substances possessed of the requisite chemical properties, interferes to prevent them from reaching the substances which they are destined to dissolve.

[d–d]MS, 43 is explained by Liebig [*cf.* 476[c–c] *above*]
[e]MS, 43 by Liebig
[f]MS in this case

Appendix F

Book III, Chapter xviii ("Of the Calculation of Chances"), in the MS and 1st (1843) edition

[This chapter was so extensively revised for the 2nd (1846) edition that JSM had it (and Book III, Chapter xxv; see Appendix G below) offprinted from the 2nd edition as a pamphlet (see the Textual Introduction, lxxxi above). The 1843 version is printed below, with variant notes giving the MS readings. Passages that were substantially retained in later editions are surrounded by square brackets, with footnoted references to the text of the 8th edition as printed above.]

§ 1. [*The foundation of the doctrine of chances, as taught by Laplace, defective*] ["Probability," says Laplace,* "has reference partly to our ignorance, partly to our knowledge. We know that among three or more events, one, and only one, must happen; but there is nothing leading us to believe that any one of them will happen rather than the others. In this state of indecision, it is impossible for us to pronounce with certainty on their occurrence. It is, however, probable that any one of these events, selected at pleasure, will not take place; because we perceive several cases, all equally possible, which exclude its occurrence, and only one which favours it."][1]

Such is this great mathematician's statement of the logical foundation upon which rests, according to him, the theory of chances: and if his unrivalled command over the means which mathematics supply for calculating the results of given data, necessarily implied an equally sure judgment of what the data ought to be, I should hardly dare give utterance to my conviction, that in this opinion he is entirely wrong; that his foundation is altogether insufficient for the superstructure erected upon it; and that there is implied, in all rational calculation of the probabilities of events, an essen-

Essai Philosophique sur les Probabilités, fifth Paris edition, p. 7.

[[1] See 534.2–9 above.]

tial condition, which is either overlooked in Laplace's statement, or so vaguely indicated as neither to be suggested to the reader, nor kept in view by the writer himself.

[To a calculation of chances,][2] [according to Laplace, two things are necessary: we must know that of several events some one will certainly happen, and no more than one; and we must not know, nor have any reason to expect, that it will be one of these events rather than another.][3] I contend [that these are not the only requisites, and that][4] another supposition is necessary. This supposition it might be imagined that Laplace intended to indicate, by saying that all the events must be equally possible (*également possibles*). But his next sentence shows that, by this expression, he did not mean to add anything to the two conditions which he had already suggested. "The theory of chances consists in reducing all events of the same kind to a certain number of cases equally possible, that is, such that we are *equally undecided* as to their existence; and to determine the number of these cases which are favourable to the event of which the probability is sought." By "events equally possible," then, he only means events "such that we are equally undecided as to their existence;" [a]that we[a] have no reason to expect one rather than another; which is not a third condition, but the second of the two previously specified. I, therefore, feel warranted in affirming that [Laplace has overlooked, in][5] this [general theoretical statement, a necessary part of the foundation of the doctrine of chances.][6]

§ 2. [*The real foundation, what*] [To be able][1] [to pronounce two events equally probable, it is not enough that we should know that one or the other must happen, and should have no][2] ground [for conjecturing which. Experience must have shown that the two events are of equally frequent occurrence. Why, in tossing up a halfpenny, do we reckon it equally probable that we shall throw cross or pile? Because][3] experience has shown [that in any great number of throws, cross and pile are thrown about equally often; and that the more throws we make, the more nearly the equality is perfect. We][4] call the chances even, because if we stake equal sums, and play a certain large number of times, experience proves that our gains and losses will about balance one another; and will continue to do so, however long afterwards we continue playing: while on the contrary, if we give the

[2 See 534.18 above.]
[3 See 534.18–21 above.]
[4 See 534.22 above.]
[5 See 534.22–3 above.]
[6 See 534.23–4 above.]
[1 See 534.24 above.]
[2 See 534.24–6 above.]
[3 See 534.26–535.1 above.]
[4 See 535.1–3 above.]

a–a+43

slightest odds, and play a great number of times, we are sure to lose; and the longer we continue playing, the greater losers we shall be. If experience did not prove this, [we should proceed as much at haphazard in staking equal sums][5] [as in laying odds][6]; we should have no more reason for expecting not to be losers by the one wager than by the other.

It would indeed require strong evidence to persuade any rational person that by a system of operations upon numbers, our ignorance can be coined into science; and it is doubtless this strange pretension which has driven a profound thinker, M. [a] Comte, into the contrary extreme of rejecting altogether a doctrine which, however imperfectly its principles may sometimes have been conceived, receives daily verification from the practice of insurance, and from a great mass of other positive experience. The doctrine itself is, I conceive, sound, but the manner in which its foundations have been laid by its great teachers is most seriously objectionable. Conclusions respecting the probability of a fact rest not upon a different, but upon the very same basis, as conclusions respecting its certainty; namely, not our ignorance, but our knowledge: knowledge obtained by experience, of the proportion between the cases in which the fact occurs, and those in which it does not occur. Every [calculation of chances is grounded on an induction: and to render the calculation legitimate, the induction must be a valid one. It is not less an induction, though it does not prove that the event occurs in all cases of a given description, but only that out of a given number of such cases, it occurs in about so many. The fraction which mathematicians use to designate the probability of an event, is the ratio of these two numbers; the ascertained proportion between the number of cases in which the event occurs, and the sum of all the cases, those in which it occurs and in which it does not occur taken together. In playing at cross and pile, the description of cases concerned are throws, and the probability of cross is one half, because][7] it is found that [if we throw often enough, cross is thrown about once in every two throws][8]; and because this induction is made under circumstances justifying the belief that the proportion will be the same in other cases as in the cases examined. [In the cast of a die, the probability of ace is one-sixth; not][9], as Laplace would say, [because there are six possible throws, of which ace is one, and because we do not know any reason why one should turn up rather than another;][10] [but because we do][11] [know][12] [that in a hundred, or a million of throws,

[5 See 535.10–11 above.]
[6 See 535.11–12 above.]
[7 See 540.1–10 above.]
[8 See 540.10–11 above.]
[9 See 540.11–12 above.]
[10 See 540.12–14 above.]
[11 See 540.15 above.]
[12 See 540.16 above.]

[a]MS Auguste

ace][13] will be [thrown][14] [about one-sixth of that number, or once in six times.][15]

Not only is this third condition indispensable, but if we have that, we do not want Laplace's two. It is not necessary that we should know how many possibilities there are, or that we should have no more reason for expecting one of them than another. If a north wind blows one day in every ten, the probability of a north wind on any given day will be one-tenth, even though of the remaining possibilities a west wind should be greatly the most probable. If we know that half the trees in a particular forest are oaks, though we may be quite ignorant how many other kinds of trees it contains, the chance that a tree indiscriminately selected will be an oak is an even chance, or, in mathematical language, one-half. So that the condition which Laplace omitted is not merely one of the requisites for the possibility of a calculation of chances; it is the only requisite.

In saying that he has omitted this condition, I am far from meaning to assert, that he does not frequently take it into consideration in particular instances; nor indeed could he fail to do so, since whenever any experience bearing upon the case really exists, he would naturally consult that experience to assure himself of the fulfilment of his second condition, that there be no reason for expecting one event rather than another. When experience is to be had, he takes that experience as the measure of the probability: his error is only in imagining that there can be a measurement of probability where there is no experience. The consequence of this error has been his adoption of conclusions not indeed contrary to, but unsupported by, experience. He has been led to push the theory and its applications beyond the bounds which confine all legitimate inferences of the human mind; by extending them to subjects on which the absence of any ground for determining between two suppositions, does not arise from our having equal grounds for presuming both, but from our having an equal absence of grounds for presuming either.

According to his views, indeed, the calculation of chances should be much more universally applicable to things of which we are completely ignorant, than to things of which we have partial knowledge. Where we have some experience of the occurrence of each of the conflicting possibilities, it may often be difficult, according to the prescriptions of the theory, to reduce those possibilities to a definite number of cases, all equally probable; but when the case is out of the reach of all experience, so that we have no difficulty in being "equally undecided" respecting the possibilities, there is nothing to make us halt or waver in applying the theory. If the question be whether the inhabitants of Saturn have red hair, we need only know the

[13 See 540.16–17 above.] [14 See 540.17 above.]
[15 See 540.17–18 above.]

number of the prismatic colours, and of their more marked compounds, and we can at once assign the fraction corresponding to the probability! It is evident that probability, in any sense in which it can operate upon our belief or conduct, has nothing to do with such chimerical evaluations, and that entire suspension of judgment, where we have no evidence, is the only course befitting a rational being. To entitle us to affirm anything positive about uncertain facts, whether [b]it be[b] that one supposition is more probable than another, or only that it is equally probable, we must have the testimony of experience, that, taking the whole of some class of cases, the one guess will be oftener right, or as often right as the other. The estimation, in short, of chances, like that of certainties, is only rational when grounded upon a complete induction by observation or experiment.*

*Confusion is sometimes introduced into this subject by not adverting to the distinction between the chances that a given event will happen, and the chances that a guess, not yet made, respecting its occurrence, will be right. Supposing that I have no more reason to expect one event than another, it is (from experience of human actions) an equal chance whether I guess A or B; but it is not, therefore, an equal chance whether A or B takes place.

The fallacy has been stated thus. Suppose that either A or B must happen: and let the chance that A will happen be x: as certainty is represented by 1, the chance that B will happen is $1 - x$. Now, the chance that the event I guess will come to pass, is made up of two chances: the chance that I shall guess A and that A will happen, *plus* the chance that I shall guess B and that B will happen. The chance that I shall guess A being $\frac{1}{2}$; the chance that I shall guess A and that A will happen, is compounded of $\frac{1}{2}$ and x: it is therefore $\frac{1}{2}x$. The chance that I shall guess B being also $\frac{1}{2}$, the chance that I shall guess B and that B will happen, is $\frac{1}{2}(1 - x)$. But the sum of these two is $\frac{1}{2}$: therefore the chance that the event I guess will come to pass, is always an even chance. But since it is an even chance that my guess will be right, it is an even chance which of the two events will occur, whatever may be their comparative frequency in nature.

The whole of this reasoning is sound up to the last step, but that step is a *non sequitur*. Before I have guessed, or until I have made my guess known, it is an even chance that I guess right; but when I have guessed, and guessed A, it is no longer an even chance that I *have* guessed right; otherwise there would be an even chance in favour of the most improbable event. Let the question be, Is Queen Victoria at this moment alive: and let me be required to guess aye or no, without knowing about what, in order that I may be equally likely to guess the one and the other. No one will say it is an even chance which is true; but it really is an even chance whether my guess will be right. The chance of my guessing in the negative and being right, is $\frac{1}{2}$ of a very small chance, say, perhaps $\frac{1}{100000}$, but the chance of my guessing in the affirmative, and being right, is $\frac{1}{2}$ of the remaining $\frac{99999}{100000}$; so that the two together are $\frac{1}{2}$. When, however, I have guessed, and told my guess, the even chance which of the two I should guess is converted into a certainty. If I have guessed aye, the chance that I am right is $\frac{99999}{100000}$: if no, it is only $\frac{1}{100000}$.

[b]-[b]+43

§ 3. [*Theorem of the doctrine of chances, which relates to the cause of a given event*] [From][1] these principles [it is easy to deduce the demonstration of that theorem of the doctrine of probabilities, which is the foundation of its][2] principal [application to][3] judicial or other [inquiries for ascertaining the occurrence of a given event, or the reality of an individual fact. The signs or evidences by which a fact is usually proved, are some of its consequences: and the inquiry hinges upon determining what cause is [a] most likely to have produced a given effect. The theorem applicable to such investigations is the Sixth Principle in Laplace's *Essai Philosophique sur les Probabilités*, which is described by him as][4] "the [fundamental principle of that branch of the Analysis of Chances, which consists in ascending from events to their causes."*

Given an effect to be accounted for, and there being several causes which might have produced it, but of the presence of which, in the particular case, nothing is known; the probability that the effect was produced by any one of these causes *is as the antecedent probability of the cause, multiplied by the probability that the cause, if it existed, would have produced the given effect.*

Let M be the effect, and A, B, two causes, by either of which it might have been produced. To find the probability that it was produced by the one and not by the other, ascertain which of the two is most likely to have existed, and which of them, if it did exist, was most likely to produce the effect M: the probability sought is a compound of these two probabilities.

CASE I. Let the causes be both alike in the second respect; either A or B, when it exists, being supposed equally likely (or equally certain) to produce M; but let A be in itself twice as likely as B to exist, that is, twice as frequent a phenomenon. Then it is twice as likely to have existed in this case, and to have been the cause which produced M.

For, since A exists in nature twice as often as B; in any 300 cases in which one or other existed, A has existed 200 times and B 100. But either A or B must have existed wherever M is produced: therefore in 300 times that M is produced, A was the producing cause 200 times, B only 100, that is, in the ratio of 2 to 1. Thus, then, if the causes are alike in their capacity of producing the effect, the probability as to which actually produced it, is in the ratio of their antecedent probabilities.

*Pp. 18–19. The theorem is not stated by Laplace in the exact terms in which I have stated it; but the identity of import of the two modes of expression is easily demonstrable.

[[1] See 543.2 above.] [[2] See 543.2–4 above.]
[[3] See 543.4 above.] [[4] See 543.4–10 above.]

[a]MS the

CASE II. Reversing the last hypothesis, let us suppose that the causes are equally frequent, equally likely to have existed, but not equally likely, if they did exist, to produce M: that in three times][5] that [A occurs, it produces that effect twice, while B, in three times, produces it only once. Since the two causes are equally frequent in their occurrence; in every six times that either one or the other exists, A exists three times and B three times. A, of its three times, produces M in two; B, of its three times, produces M in one. Thus, in the whole six times, M is only produced thrice; but of that thrice it is produced twice by A, once only by B. Consequently, when the antecedent probabilities of the causes are equal, the chances that the effect was produced by them are in the ratio of the probabilities that if they did exist they would produce the effect.

CASE III. The third case, [b]that in which[b] the causes are unlike in both respects, is solved by what has preceded. For, when a quantity depends upon two other quantities, in such a manner that while either of them remains constant it is proportional to the other, it must necessarily be proportional to the product of the two quantities, the product being the only function of the two which obeys that][6] particular [law of variation. Therefore, the probability that M was produced by either cause, is as the antecedent probability of the cause, multiplied by the probability that if it existed it would produce M. Which was to be demonstrated.

Or we may prove the third case as we proved the first and second. Let A be twice as frequent as B; and let them also be unequally likely, when they exist, to produce M: let A produce it twice in four times, B thrice in four times. The antecedent probability of A is to that of B as 2 to 1; the probabilities of their producing M are as 2 to 3; the product of these ratios is the ratio of 4 to 3],[7] which therefore, if the theorem be true, [will be the ratio of the probabilities that A or B was the producing cause in the given instance.][8] And such will that ratio really be. For, since A is twice as frequent as B, out of twelve cases in which one or other exists, A exists in 8 and B in 4. But of its eight cases, A, by the supposition, produces M in only 4, while B of its four cases produces M in 3. M, therefore, is only produced at all in seven of the twelve cases; but in four of [c]these[c] it is produced by A, in three by B; hence, the probabilities of its being produced by A and by B are as 4 to 3, and are expressed by the fractions 4/7 and 3/7. Which was to be demonstrated.][9]

It is here necessary to point out another serious oversight in Laplace's

[[5] See 543.10–544.6 above.]
[[6] See 544.6–21 above.]
[[7] See 544.21–30 above.]
[[8] See 544.30–1 above.]
[[9] See 544.31–7 above.]

[b-b]MS when
[c-c]MS those [*printer's error*?]

theory. When he first introduces the foregoing theorem, he characterises it correctly, as the principle for determining to which of several *causes* we are to attribute a known fact. But after having conceived the principle thus accurately, when he comes to its applications he no longer restricts it to the ascertainment of causes alone, but, without any previous notice substitutes for the idea of causes that of *hypotheses*, or suppositions of any kind. In this extended sense, I do not conceive the proposition to be tenable. The hypotheses must be either causes, or at least signs showing the existence of causes. If we could be permitted to substitute mere suppositions affording no ground for concluding that the effect would be produced, in the room of causes capable of producing it, the theorem thus extended would stand as follows. A fact, M, having happened, the probability of the truth of any arbitrary supposition altogether unconnected with M, is as the antecedent probability of the supposition, multiplied by the probability that if the supposition was true M would happen; that is, multiplied by the antecedent probability of M, since M is neither more [d]nor[d] less probable on account of a supposition which has nothing to do with the causes of it. Now the proposition, as thus stated, is an absurdity. The probability that when M happened A had previously happened, is not the antecedent probability of M multiplied by that of A, but the antecedent probability of A only. The antecedent probability of M cannot be an element of a question into which the occurrence of M enters not as a contingency but as a certainty. What the product of the antecedent probabilities of A and M does give, is, not the probability of the one when the other is a known past event, but the antecedent probability of the two together, considered as future events.

This error of Laplace has not been harmless. We shall see hereafter, in treating of the Grounds of Disbelief, that he has been led by it into serious practical mistakes when attempting to pronounce upon the circumstances which render any statement incredible.

§ 4. [*In what cases the doctrine is practically applicable*] [a]From the preceding view of the foundation of the doctrine of chances, its general principles may be seen to be applicable in a rough way to many subjects which are by no means amenable to its precise calculations. To render these applicable, there must be numerical data, derived from the observation of a very large number of instances. The probabilities of life at different ages, or in different climates; the probabilities of recovery from a particular disease; the chances of the birth of male or female offspring; the chances of the loss of a vessel in a particular voyage; all these admit of estimation

[d-d]MS or
[a-a][*this paragraph also appears in* 46 *(see* 544[i] *above), and part was retained in later editions (cf.* 542[b-b] *above)*]

sufficiently precise to render the numerical appreciation of their amount a thing of practical value; because there are bills of mortality, returns from hospitals, registers of births, of shipwrecks, &c., founded on cases sufficiently numerous to afford average proportions which do not materially vary from year to year, or from ten years to ten years. But where observation and experiment have not afforded a set of instances sufficiently numerous to eliminate chance, and sufficiently various to eliminate all non-essential specialities of circumstance, to attempt to calculate chances is to convert mere ignorance into dangerous error by clothing it in the garb of knowledge.[a]

[It remains to examine the bearing of the doctrine of chances upon the peculiar problem][1] for the sake of which we have on this occasion adverted to it, [namely, how to distinguish coincidences which are casual from those which are the result of law; from those in which the facts which accompany or follow one another are somehow connected through causation.][2]

§ 5. [*How the doctrine is applicable to the elimination of chance*] [The doctrine of chances affords means by which, if we knew the *average* number of coincidences to be looked for between two phenomena connected only casually, we could determine how often any given deviation from that average will occur by chance. If the probability of any casual coincidence, considered in itself, be $\frac{1}{m}$, the probability that the same coincidence will be repeated n times in succession is $\frac{1}{m^n}$. For example, in one throw of a die the probability of ace being $\frac{1}{6}$; the probability of throwing ace twice in succession will be 1 divided by the square of 6, or $\frac{1}{36}$. For ace is thrown at the first throw once in six, or six in thirty-six times: and of those six, the die being cast again, ace will be thrown but once; being altogether once in thirty-six times. The chance of the same cast three times successively is, by a similar reasoning, $\frac{1}{6^3}$ or $\frac{1}{216}$: that is, the event will happen, on [a]a[a] large average, only once in two hundred and sixteen throws.

We have thus a rule [b]by which[b] to estimate the probability that any given series of coincidences arises from chance; provided we can measure correctly the probability of a single coincidence. If we][1] could [obtain an equally precise expression for the probability that the same series of coin-

[[1] See 545.2–3 above.] [[2] See 545.3–6 above.]
[[1] See 545.7–22 above.]

[a-a]MS any [b-b]+43

cidences arises from causation, we should only have to compare the numbers. This, however, can rarely be done. Let us see what degree of approximation can practically be made to the necessary precision.

The question falls within Laplace's sixth principle,][2] of which, a short distance back, we gave the demonstration. [The given fact, that is to say, the series of coincidences, may have originated either in a casual conjunction of causes or in a law of nature. The probabilities, therefore, that the fact originated in these two modes, are as their antecedent probabilities, multiplied by the probabilities that if they existed they would produce the effect. But the particular combination of chances if it occurred, or the law of nature if real, would *certainly* produce the series of coincidences. The probabilities, therefore, that the coincidences are produced by the two causes in question, are as the antecedent probabilities of the causes. One of these, the antecedent probability of the combination of mere chances which would produce the given result, is an appreciable quantity. The antecedent probability of the other supposition may be susceptible of a more or less exact estimation, according to the nature of the case.

In some cases, the coincidence, supposing it to be the result of causation at all, must be the result of a known cause; as the succession of aces, if not accidental, must arise from the loading of the die. In such cases we may be able to form a conjecture as to the antecedent probability of such a circumstance, from the characters of the parties concerned, or other such evidence; but it would][3] clearly [be impossible to estimate that probability with anything like numerical precision. The counter-probability, however, that of the accidental origin of the coincidence, dwindling so rapidly as it does at each new trial; the stage is soon reached at which the chance of unfairness in the die, however small in itself, must be greater than that of a casual coincidence: and on this ground, a practical decision can generally be come to without much hesitation, if there be the power of repeating the experiment.

When, however, the coincidence is one which cannot be accounted for by any known cause, and the connexion between the two phenomena, if produced by causation, must be the result of some law of nature hitherto unknown; which is the case we had in view in the last chapter; then, although the probability of a casual coincidence may be capable of appreciation, that of the counter-supposition, the existence of an undiscovered law of nature, is clearly unsusceptible of even an approximate][4] evaluation. [In order to have the data which such a case would require, it would be necessary to know what proportion of all the individual sequences or coexistences occurring in nature are the result of law, and what proportion

[[2] See 545.22–546.1 above.] [[3] See 546.2–19 above.]
[[4] See 546.19–32 above.]

are][5] the result of chance. [It being evident that we cannot form any plausible conjecture as to this proportion, much less appreciate it numerically, we cannot attempt any precise estimation of the comparative probabilities. But of this we are sure, that the detection of an unknown law of nature—of some previously unrecognised constancy of conjunction among phenomena—is no uncommon event. If, therefore, the number of instances in which a coincidence is observed, over and above that which would arise on the average from the mere concurrence of chances, be such that so great an amount of coincidences from accident alone would be an extremely uncommon event; we have reason to conclude that the coincidence is the effect of causation, and may be received (subject to correction from further experience) as an empirical law. Further than this, in point of precision, we cannot go; nor, in most cases, is greater precision required, for the solution of any practical doubt.][6]

[5 See 546.32–5 above.]
[6 See 546.35–547.10 above.]

Appendix G

Book III, Chapter xxv ("Of the Grounds of Disbelief"), § 5, in the MS and 1st (1843) edition

[This section was rewritten as §6 for the 2nd (1846) edition, the final §5 being added at the same time. Though JSM had the whole of Chapter xxv offprinted from the 2nd edition, with Book III, Chapter xviii (see headnote to Appendix F above), the major revisions were only in this section, and therefore the variants to the rest of the chapter are given in the normal way in the text above. The 1843 version of this section is printed below, with variant notes giving the MS readings. Passages that were substantially retained in later editions are surrounded by square brackets, with footnote references to the text of the 8th edition as printed above.]

§ 5. [*An opinion of Laplace examined*] While the defenders of Christianity against Hume have thus confounded two different meanings of the word improbability, contending that because improbability of the one kind is not necessarily a ground of disbelief, neither therefore is the other, and that nothing supported by credible testimony ought ever to be disbelieved; Laplace, again, falling into the same confusion between the two meanings, contends on the contrary, that because improbability of the one kind is a sufficient ground for disbelief, the other is so too; and that what is improbable before the fact, is therefore (not indeed in all cases, but in a peculiar class of cases which I am about to specify), incredible after it.

[If, says Laplace, there][1] are [one thousand tickets in a box, and one only has been drawn out; then if an eye-witness affirms that the number drawn was 79, this, though the chances were 999 in 1000 against it, is not][2] incredible, because the chances were equally great against every other number. But (he continues) if there are [in the box 999 black balls and only one white, and the witness affirms that the white ball was drawn,][3] this is incred-

[1 See 635.6 above.]
[2 See 635.6–8 above.]
[3 See 635.10–11 above.]

ible; because there was but one chance in favour of white, and 999 in favour of *some* black ball.

This appears to me entirely fallacious. It is evident, both from general reasoning and specific experience, that the white ball will be drawn out exactly as often, in any large number of trials, as the ticket No. 79 will; the two assertions, therefore, are precisely on the same level in point of credibility. There is one way of putting the case which, I think, must carry conviction to every one. Suppose that the thousand balls are numbered, and that the white ball happens to be ticketed 79. Then the drawing of the white ball, and the drawing of No. 79, are the very same event; how then can the one be credible, the other absolutely incredible? A witness sees it drawn, and makes his report to us: if he says [a]that[a] No. 79 was drawn, according to Laplace he may be believed; if he says a white ball was drawn, we are bound to disbelieve him. Is this rational? Is it not clear, on the contrary, that the only difference there could be in the credit due to him would arise from moral causes, namely, from the influence which (if the witness knew that there was but one white ball in a thousand) might be assigned to the greater apparent wonder in the latter case? which to one kind of person would be a temptation to deceive, or to take up a hasty impression, while to another, the same thing would be a motive for assuring himself more positively of the fact, and would therefore actually increase the credit due to his testimony.

The mathematical reasoning which misled Laplace into this logical error, is too long to be here quoted. It is found in the section of his *Essai Philosophique sur les Probabilités* entitled *De la Probabilité des Témoignages*, and is founded upon a misapplication, noticed by us in a former place, of his own sixth theorem of the doctrine of chances; a theorem which he himself describes as that by which we determine the probability that a given effect was produced by one or by another of several causes capable of producing it. The substance of his argument may be briefly stated as follows: Treating the assertion of the witness as the effect, he considers as its two possible causes, the veracity or mendacity of the witness on the particular occasion, that is, the truth or falsity of the fact. According to the theorem, the probability that the effect was produced by a particular cause, is as the antecedent probability of the cause, multiplied by the probability that the cause, if it existed, would produce the given effect. Accordingly (says [b]Laplace[b]) in the case of the thousand tickets, the cause *mendacity* might produce any one of 999 untrue statements, while in the case of the balls, there being only two statements to make, viz., *white* or *black*, and one of these being true, the cause mendacity could only produce one untrue statement: and consequently (the antecedent probability of mendacity from the character of the witness being

[a-a]+43
[b-b]MS he

supposed the same in both cases) mendacity was 999 times less likely to have produced the particular assertion made, and is therefore 999 times less likely to have existed, in the former case than in the latter.

The error of this argument seems to be [c]the same which[c] we pointed out in a former chapter,* that of applying a theorem, only true of the degrees of probability of causes, to the probability of what are neither causes nor indications of causes, nor in any other way specially connected with the effect. The point in question is, the comparative probability of two suppositions, that the witness lies, and that he speaks truth. But these are not two possible *causes* of the given effect (the witness's assertion); they are merely two possible qualities of it. The truth of the assertion *is*, indeed, on the supposition of veracity, the cause of its being made; but the falsity of it is not, on any supposition, a cause of its being made. It is not incompatible with the dishonesty of the witness, that he should have spoken the truth: the difference between the two suppositions of honesty and dishonesty is, that on the one he would certainly speak the truth, while on the other he was just equally likely to speak that or anything else. If the falsity of the proposition were a real cause for his asserting it, and there were no possible mode of accounting for a false assertion but by supposing that it is made precisely because of its falsity, I do not see how Laplace's argument could be resisted. The case where there are 999 possible false assertions, and that in which there is but one, would then present a vast difference in the probability that the assertion actually made proceeded from falsity; because in the one case a mendacious witness was sure to assert the one false fact, in the other there would be an equal chance of his asserting any one of the 999. But as it is, the falsity was a mere accident of the assertion, not the cause of it; and even on the supposition of dishonesty, the statement is as likely to be true as false, while on the supposition of honesty it is certain to be true. The assertion, therefore, is credible.

[With these remarks we][4] shall [close the discussion of the Grounds of Disbelief; and along with it, such exposition as][5] our space admitted, [and as the writer][6] had [it in his power to furnish, of the Logic of Induction.][7]

*Supra, pp. 1146–7.

[4 See 638.12 above.]
[5 See 638.12–13 above.]
[6 See 638.13 above.]
[7 See 638.14 above.]

c–cMS what

Appendix H

Book VI, Chapter xi ("Of the Logic of Practice, or Art; including Morality and Policy"), §6, in MS, 1st (1843), and 2nd (1846) editions

[This section was replaced by §§6 and 7 of the 3rd (1851) and subsequent editions (the chapter itself became no. xii with the addition of a new Chapter xi in the 5th [1862] edition). The 1846 version is printed below, with variant notes giving the readings of the MS and 1st edition.]

§ 6. [*Application of the preceding principles to Morality*] After these observations on the Logic of Practice in general, little needs here be said of that department of Practice which has received the name of Morality; since it forms no part of the appropriate object of this work to discuss how far morality depends, like other arts, upon the consideration of means and ends, and how far, if at all, upon anything else.

This, however, may be said; that questions of practical morality are partly similar to those which are to be decided by a judge, and partly to those which have to be solved by a legislator or administrator. In some things our conduct ought to conform itself to a prescribed rule; in others, it is to be guided by the best judgment which can be formed of the merits of the particular case.

Without entering into the disputed questions respecting the foundation of morality, we may consider as a conclusion following alike from all systems of ethics, that, in a certain description of cases at least, morality consists in the simple observance of a rule. The cases in question are those in which, although any rule which can be formed is probably (as we remarked on maxims of policy) more or less imperfectly adapted to a portion of the cases which it comprises, there is still a necessity that some rule, of a nature simple enough to be easily understood and remembered, should not only be laid down for guidance, but universally observed, in order that the various persons concerned may know what they have to expect: the inconvenience of uncertainty on their part being a greater evil than that which may possibly

arise, in a minority of cases, from the imperfect adaptation of the rule to those cases.

Such, for example, is the rule of veracity; that of not infringing the legal rights of others; and so forth: concerning which it is obvious that although many cases exist in which a deviation from the rule would in the particular case produce more good than evil, it is necessary for general security, either that the rules should be inflexibly observed, or that the license of deviating from them, if such be ever permitted, should be confined to definite classes of cases, and of a very peculiar and extreme nature.

With respect, therefore, to these cases, practical ethics must, like the administration of positive law, follow a method strictly and directly ratiocinative: whether the rules themselves are obtained, like those of other arts, from a scientific consideration of tendencies, or are referred to the authority of intuitive consciousness or express revelation.

In cases, however, in which there does not exist a necessity for a common rule, to be acknowledged and relied on as the basis of social life; where we are at liberty to inquire what is the most moral course under the particular circumstances of the case, without reference [a], or without exclusive reference,[a] to the authorized expectations of other people; there the Method of Ethics cannot differ materially from the method of every other department of practice. Like other arts, it sets out from a general principle, or original major premiss, enunciative of its particular end: whether that end be the greatest possible happiness, as is contended by some, or [b](as others hold) the conformity of our character to ideal perfection according to some particular standard[b]. But on this as on other subjects, when the end has been laid down, it belongs to Science to inquire what are the kinds of actions by which this end, this happiness or this perfection of character, is capable of being realized. When Science has framed propositions, which are the completed expression of the whole of the conditions necessary to the desired end, these are handed over to Art, which has nothing further to do but to transform them into corresponding rules of conduct.

[a-a]+46
[b-b]MS, 43 the conformity . . . standard, as others hold

Appendix I

Typographical Errors in the 8th Edition

THE LIST BELOW gives those errors that are silently corrected in the text. Typographical errors in earlier editions are ignored;[1] slips of the pen in the Press-copy Manuscript are listed in a note below.[2] The intention is to err on the cautious side: except when the error is visually manifest, the evidence of other editions (and the source, in the case of quotations) is given, to support the choice of readings; on the other hand, evidence of editorial suspicion about retained variant readings is indicated by "[*printer's error?*]" at the end of the relevant variant notes in the text. An example will be seen at 659[c–c], where in the MS "conceptions" was altered to "conception," but "conceptions" appears in 43 and 46, with "conception" restored in 51. Another, much

[1]Attention should be called, however, to two typographical errors in the 1st edition, which provides the copy-text for Appendix F. At 1144.n28 the 1st edition has "nay" for "say"; at 1145.19 the 1st edition reads "either which" for "either of which"; in both cases the manuscript gives the reading here accepted.

[2]Most of these slips of the pen were caught in the 1st ed.; indication is given where they were not. The form of the entries is as for the typographical errors.

cxii.3 as well] as is well
103.26 is general] is generally
115.n5 of'] of' "
217.19 ACB] ACD [*not corrected until* 46]
581.24 negroes are] negroes have
611.13 apples] pebbles [*subsequently in this example JSM cancelled each instance of* apples *and interlined* pebbles]
653.20 abstractas] abstractae [*error repeated* MS—62]
658.n18 which is though real is] which, though real, is [*the original reading was* which is real but; *JSM interlined* though, *cancelled* but *and interlined the second* is, *without cancelling the first* is]
681.13 assented and] assented to and
681.18 on those] in those
704.24 to the] to be the
729.32 treated of considered] treated of [considered *not cancelled when* treated of *interlined*]
802.34 all emotion] all motion [*not corrected until* 46]
864.14 case to which] case which

less common case of retention, as a variant, of a probable printer's error, because it led to another textual change, may be seen at 686[c–c], where the original "applied" became "implied" in 51, and "employed" in 56 (cf. 688[b–b], where a faintly interlined "a" before "separate assertion" in the MS does not appear in 43, and in 46 "assertion" is changed to "assertions"). In a few places Greek accents have been regularized.

The entries are in the following form: Page and line reference to the present text. Reading in the 8th edition] Corrected reading in the present edition [Evidence for the corrected reading]. In the evidence, "*as in* MS,43" means that the corrected reading is found in the manuscript and 1st edition; "*as in* 51—62" means that the corrected reading is found in the 3rd to the 5th editions inclusive.

The first five entries are from the Table of Contents.

vi.13 mind] minds [*as in* MS *and* text]
xii.33 casual] causal [*as in* MS—56]
xv.28 of Philosophical] of a Philosophical [*as in* MS—68]
xvii.10 casual] causal [*as in* MS—68]
xix.30 science] Science [*as in* MS—65]
15.nn29–30 correspond] corresponds [*as in* 56]
30.2 common:] common; [*as in* MS—68]
32.n4 p.22] p.122 [*as in* 51,56]
35.29 reader] hearer [*as in* MS—68, *and below in same paragraph*]
42.18 see] see, [*as in* 43—68; MS *has* see;]
43.3 it] its [*as in* MS—68]
47.5 *Ποσὸν*] *Ποσόν* [*no accent in* MS—46]
60.n6 nous mêmes] nous-mêmes [*as in* MS—68]
61.nn15–16 le pensée] la pensée [*as in* Source,MS—68]
79.6 *το*] *τὸ* [*as elsewhere*]
92.8 bird or] bird, or [*as in* MS—62]
94.4 *προτέρον*] *πρότερον*
101.n10 concrete] correcter [*as in* Source]
102.2 matter-of fact] matter-of-fact
107.21 proposi] proposi- [*resetting removes from present edition*]
111.n24 *ούν*] *οὖν* [*as in* MS,46—62]
112.n5 *οὔσιαι*] *οὖσιαι*
117.16 *mark* of] *mark of* [*as in* MS,43,46 *and in previous clause*]
119.25 names'] names,
119.37 *γὲνοσ*] *γένοσ* [*as in* MS—62]
119.39 *διαφορὰ*] *διαφορά*
119.40 *ἴδιόν*] *ἴδιον*
148.n7 flame.] flame, [*as in* 51-68]
154.n3 vain glory] vain-glory [*as in* Source,43—68]
156.1 *δε*] *δὲ* [*as in* MS]
159.29 all] All [*as in* MS—62]
180.n8 with another] with one another [*as in next clause*]
181.n8 at once] whence [*as in* Source *and next sentence*]

193.8–9 *according* to] *according to* [*as in* MS—46 *and to give parallelism*]
195.30–1 inferenccs] inferences
217.6 B E and C D] BE and CD [*for consistency; when the other letters in this passage were brought together in* 68 *these pairs were not*]
217.8 FORMULA.—] FORMULA. [*as in* MS—68 *and previous headings*]
217.12 FORMULA.—] FORMULA. [*ibid.*]
217.17 FORMULA.—] FORMULA. [*ibid.*]
217.18 The] [*paragraph*] The [*ibid.*]
222.34 suceptible] susceptible
228.16 contained] contained, [*dropped character*]
242.n1 *Organum*] *Organon*
244.3 *quality*] *quantity* [*as in* Source,MS]
250.2–3 fundamenta] fundamental [*dropped character*]
270.n10 marꝗs] marks
287.8 angage] engage
297.4 descriptions] description [*as in* MS]
300.n8 successfully] successively [*as in* Source,51—62]
302.n13 o] on [*dropped character*]
309.2 casses] cases
357.28 do.] do." [*as in* 51,56; *the break in the quotation is needed, as JSM omits a paragraph from his source; in the present edition, because of restyling, the break is indicated by a line space*]
361.n1 ἆν] ἄν
365.17 εῖναι] εἶναι
365.27 οἰον] οἷον [*as in* 56—68]
365.27 ὅ ὁ
365.28 ὅ] ὁ
365.32 τοῦσ] τοὺσ
389.24 of a solid] of solid [*as in* MS]
390.25 circumstances] circumstance [*as in* MS—65]
390.40 method] Method
392.12 method] Method
394.20 antece] antece- [*resetting removes from present edition*]
409.33 though] through [*as in* MS—62]
417.21 course] cause [*as in* MS—68]
421.10 proceedings] Proceedings [*as in* 65,68; *italicized as title in present edition*]
422.33 a b c . . . b c] *a b c . . . b c* [*as elsewhere*]
427.32 in great] in a great [*as in* Source,MS—56]
445.n1 *impinge*] *impinges* [*as in* 51,56 *and passage above*]
458.28 method] Method [*as in* MS—65]
461.29–30 expressd] expressed
467.20 effect] affect [*as in* MS—68]
477.37 magnet,the] magnet, the
500.32 bnt] but
517.18 if on] if of [*as in* MS—65]
518.n1 §7] §8 [*when* §5 *of* Bk. III, Chap. v *was added in* 72, *JSM forgot to change this reference*]
540.31 method] Method [*as in* 51—62]
579.23 kind] Kind [*as in* MS—62]

579.25 kind] Kind [*as in* MS—65]
628.5 kind] Kind [*as in* MS—62]
640.11 que ceux] que de ceux [*as in* Source, 51—65]
640.12 que ceux] que de ceux [*ibid.*]
660.38 ""notiones] "notiones
673.23 true.] true." [*as in* MS—56; *the break in the quotation is needed, as JSM omits three sentences from his source; in the present edition, through restyling, the break is indicated by a line space*]
676.n15 containing water] containing no water [*as in* Source]
695.2 *ποίητης*] *ποιητής*
695.5 *φυσίκος*] *φυσικός*
699.17 the kind] this kind [*as in* Source, MS—68]
699.35 be no longer] no longer be [*as in* Source, MS—46]
700.25 words] word [*as in* Source (*and* Source *quoted in* Source),MS—51]
700.30 necessarily] successively [*as in* Source,MS]
701.8 bifid,] bifid [*as in* Source,MS—68]
702.8 $\frac{p}{q}$] $\frac{p}{q}$ [*as in* 62—68; *in* MS $\frac{p}{q}$; *in* 43—56 $\frac{p}{q}$]
716.23 rising] arising [*as in* Source,MS—62]
718.11 character] characters [*as in* Source,MS]
718.13 arranged] ranged [*as in* Source,MS—62]
720.30 kind] Kind [*as in* MS—65]
744.27 one *individual*] *one individual* [*as in* Source,MS—62; *cf. next entry*]
744.27–8 *one* premise] one premise [*as in* Source, MS—62; *cf. previous entry*]
753.15 nopractical] no practical
757.29 n the Vedas] in the Vedas [*dropped character*]
761.35 rest, or] rest or [*as in* Source,MS—68]
762.3 substances] substantives [*as in* Source,MS—51]
769.24 metaphysics] metaphysic [*as in* Source,MS—68]
774.7 point] points [*as in* MS—68]
779.15 on] upon [*as in* Source,MS—62 *and elsewhere in same sentence*]
782.24 conception] perception [*as in* MS—62]
786.11 secondle] secondly
788.19 *pronunciat*] pronunciat [*as in* MS—62; Source *has no italics anywhere in this passage*]
792.26 *priori*] *à priori* [*dropped character*]
793.15 medicines.*] medicines."* [*deleted in the present edition through restyling*]
803.4 Of] On [*as in* MS—68]
807.26 arrangement] argument [*as in* MS—46]
809.26 words] words, [*as in* 51—68; *cf.* 809[d–d]]
810.28 would] could [*as in* Source,MS—68]
815.23 *ὁμοιὸν*] *ὅμοιον*
819.22 Composition.] Composition." [*as in* MS—46; *the break in the quotation is needed, as JSM omits three paragraphs from his source; in the present edition, because of restyling, the break is indicated by a line space*]
821.5 whose] those [*as in* MS—68]
823.32 de] De [*as elsewhere in text*]
829.4 'that we] that 'we [*as in* Source,MS—56]

885.8 different. As, for instance, in] different." As, for instance, "in [*as in* Source,MS]

885.10–11 Bourbons.' The] Bourbons.' . . . The [*as in* MS; *the ellipsis indicates the omission of the conclusion of the sentence—see entry under Coleridge,* Biographia Literaria, *in Bibliographic Appendix*]

917.29 kinds,] kinds; [*as in* MS—68]

918.10 provisions] previsions [*as in* Source,MS—56]

944.33 combination] combinations [*as in* MS—56 *and next sentence*]

947.16 augmentation] argumentation [*as in* MS—68]

Appendix J

The Press-Copy Manuscript of the *Logic*

THE HOLOGRAPH MANUSCRIPT from which the 1st edition of the *Logic* was printed is in the British Museum (Add. MSS 41624–7). It was "bequeathed by Mill to a friend, Mr. William Fidler of the India Office, from whose daughters, the last of whom died in 1928, it came to Lady Magnay from whom the Museum acquired it."[1] Bound in four volumes, it was folioed by the Museum staff in 1937 as follows: Vol. I, ff. 1–322; Vol. II, ff. 1–231; Vol. III, ff. 1–365; Vol. IV, ff. 1–294.[2] An earlier foliation, evidently entered

[1] R. F[lower], "The Autograph Manuscript of Mill's *Logic*," *British Museum Quarterly*, III (1928), 77. A letter from Lady Magnay, dated 24 October, 1928, bound with the MS, says that Mill was a "great friend" of William Fidler, and that Mrs. Fidler, whose maiden name was Taylor, was a cousin of Harriet Taylor Mill, perhaps meaning a cousin by marriage.

[2] There are a number of errors in the foliation and binding. Vol. I contains, in this order: the title page (f. 1); the Preface (ff. 2–6); the Table of Contents for the first volume as printed (ff. 7–15); an unnumbered blank folio; Book I (ff. 16–217); and Book II, Chaps. i through v (ff. 218–322). One folio, which would have Mill's folio no. 193, is missing between ff. 207 and 208 (in the text above, all the material between "may know that it" (p. 147^{w-w}) and "definition is a" (p. 149.5) is missing (the MS reading is assumed to be that of 43; the same assumption is made in the similar case in Vol. III cited below; as the British Museum's foliation is consecutive, this folio must have been extracted before 1937, and probably before the Museum acquired the manuscript in 1928. This volume ends in the middle of Mill's Gathering P.

Vol. II contains Book III, Chaps. i through xiii (ff. 1–231), and concludes with Mill's Gathering Aa. At the bottom of the final folio is written, in Mill's hand, "End of Volume I"; that is, Vol. I of the 1st edition ends here.

Vol. III contains, in this order: the Introduction (ff. 1–17), part of a Table of Contents to the 5th edition (1862) in an unknown hand (ff. 18–20); Book II, Chap. vi (ff. 21–35; f. 22 is a copy, in the same hand as that of the Table of Contents of the 5th edition, of f. 21); a continuation of the Table of Contents of the 5th edition, in the same hand (ff. 36–49); Book III, Chaps. xiv through xxv (ff. 50–246); and Book IV (ff. 247–365). Again a folio is missing (it would have Mill's folio no. 93) between ff. 338 and 339 (in the text above, all the material between "*rapprochements*," and the paragraph beginning "This shows" on p. 715 is missing); as in the earlier case, the British Museum foliation is consecutive, and so this folio must have been extracted before 1937, and probably before 1928. This volume ends with Mill's Gathering Qq. The Introduction (Mill's Gathering A) belongs, of course, in Vol. I, after the Table of Contents

for the most part by Mill currently, shows some evidence of the rewriting process; this foliation is based on the division of the work into Books.[3] There is much evidence of the printing process, including compositors' signatures,[4] marked equivalents to the paging of the first edition, and folds.[5]

(on the first folio of the Introduction someone has altered the correct indication, "Vol. I" to "Vol. II"); f. 22v gives the running title for the Introduction, and should appear opposite f. 1. Ff. 18–20, 22r, and 36–49 have no relation to Mill's manuscript at all, being presumably written by the then possessor of the manuscript to compare the Tables of Contents of the 1st and 5th editions; they are written on an undated paper watermarked "Towgood's Superfine." Also, ff. 21 and 23–35, containing Book II, Chap. vi (the conclusion of Mill's Gathering P, and all of Gathering Q) should appear at the end of MS Vol. I.

Vol. IV contains a further folio of the Table of Contents of the 5th edition in the same hand and on the same paper (f. 1); Book V (ff. 2–135); and Book VI (ff. 136–294). This volume ends with Mill's Gathering 3E. F. 153 has been bound in reverse, and ff. 213 and 214 (Mill's ff. 80 and 79) are bound in the wrong order.

[3]Because the basis of foliation differs, and because of the errors listed in the previous footnote, the two sets of numbers do not coincide except through much of MS Vol. II and the opening folios of Vol. IV. There are also some anomalies in the earlier foliation (henceforth assumed to be Mill's), which runs as follows:

Vol. I: title page not folioed; Preface and Table of Contents (ff. 1–14); Book I (ff. 1–203, with 193 missing, as noted above); and Book II, Chaps. i through v (ff. 1–20 [Gathering L], and, beginning anew with Gathering M, ff. 1–83). The B.M. f. 284 is not numbered by Mill, consisting as it does of a page on which a diagram has been pasted, the diagram having been cut out of B.M. f. 283 (Mill's f.46). Also, B.M. f. 322, the concluding folio (cut in half) does not have a Mill folio number, presumably because it contains only the conclusion of a footnote.

Vol. II: Book III, Chaps. i through xiii (ff. 1–230). The discrepancy of one folio in the two systems is explained by Mill's having numbered two successive folios as 138.

Vol. III: Introduction (ff. 1–17); no foliation, of course, of the three folios containing the Table of Contents of the 5th edition in the unknown hand; the beginning of Book II, Chap. vi (f. 84, continuing the foliation of Book II in Vol. I); no foliation for the page copied in the unknown hand; the rest of Book II, Chap. vi (ff. 1–13, the numbering beginning anew with Gathering Q); again no foliation of the fourteen folios giving the Table of Contents of the 5th edition; Book III, Chaps. xiv through xxv (ff. 1–196). (In this final group there is one gap, B.M. f. 63 not having been folioed earlier [it should be f. 14]. In this sequence the foliation gives evidence of rewriting, f. 13 being cut off ⅗ of the way down, the folio numbers of f. 55 being written over 56, on f. 133 over 136, and on ff. 187–93 over 186–91.) The foliation continues with Book IV, Chaps. i through vii (ff. 1–119, with f. 93 missing, as noted above); two successive folios are numbered 94.

Vol. IV: one folio giving part of the Table of Contents of the 5th edition (again not folioed); Book V (ff. 1–133; the number actually does not appear on f. 1, and the final folio, which would be 134, is not numbered); Book VI (ff. 1–160, with ff. 79 and 80, as noted above, being bound in reverse order; presumably by a slip of the pen, there is no folio numbered 66).

[4]Some thirteen compositors' names appear (not always very legibly), the two principals in the firm, Harrison and Edwards, doing very little of the setting, most of the stints being done by Hatfield, Burt, Jones, Kemp, and Matthis (?). One can only wish that Shakespearian scholars had as much evidence as is here available.

[5]Mill's meticulous care over his text, some might think overdone, has been indicated in the Textual Introduction, but yet another example may be cited. He indicates on the manuscript the running heads for the chapters, and in all but five cases these titles were used in the printed text; one may assume that the alterations were made with his

Following his most common practice,[6] Mill wrote the text recto only, reserving the opposite versos for notes, additions, and corrections, and collected the folios into "gatherings" (estimated equivalents to the signatures of the printed volumes) lettered from A–Z, Aa–Zz, and 3A–3E; these gatherings, normally of twenty folios each, were originally sewn together.[7] The paper is of five makes and dates, as follows: J. Coles (1836), G. Wilmot (1839), Ruse & Turners (1841), Munn & Co. (n.d., one folio only), and Towgood's Superfine (n.d.).[8] As indicated in the Textual Introduction, the

approval if not at his suggestion. The changes were as follows: in the Introduction there are two running titles on the manuscript, "The Science of Reasoning" (cancelled?) and "But Includes more than Reasoning"; these were replaced by a single running title, "Definition and Province of Logic." Book I, Chap. vi, had as its running title "Merely Verbal Propositions"; for this was substituted "Verbal and Real Propositions." Book I, Chap. vii, read "The Predicables"; this was replaced by "Classification and the Predicables." The running title of Book III, Chap. xix, originally "Extension of Derivative Laws," had added to it the words "to Adjacent Cases." And the instruction for Book VI, Chap. i, "running title, left hand Logic of the Moral Sciences right hand Introduction" (the only case in which the left title is specified) was superseded, the right-hand title being "General Remarks."

[6]Cf. the headnote to App. A, p. 955 above.

[7]Cf. *Earlier Letters*, *CW*, XIII, 505 (to Parker, March, 1842).

[8]The distribution of the various papers is as follows (with abbreviated names and dates of the papers, and asterisks indicating that only part of a gathering or chapter is included in the equivalent folios):

MS VOL.	FOLIOS	PAPER	GATHERINGS	TEXT
I	1–15	R&T41	—	Preface and Table of Contents, Vol. I
	16–231	GW39	B–P*	Bk. I, Chap. i–Bk. II, Chap. v*
	232	M&Co. nd	P*	II, v*
II	1–20	GW39	R	III, i–ii*
	21–40	JC36	S	III, ii*–iv*
	41–120	GW39	T–W	III, iv*–viii*
	121–3	JC36	X*	III, viii*
	124–36	GW39	X*	III, ix*
	137–53	JC36	X*	III, ix*–x*
	154–231	GW39	Y–Aa	III, x*–xiii
III	1–17	GW39	A	Introduction
	18–20	TSnd	—	—
	21–35	GW39	Q	II, vi
	36–8	TSnd	—	—
	39–49	R&T41	—	Table of Contents, Vol. II
	50–365	GW39	Bb–Qq	III, xiv–IV, viii
IV	1	TSnd	—	—
	2–217	GW39	Rr–3B*	V, i–VI, vii*
	218	R&T41	3B*	VI, vii*
	219–29	GW39	3B*	VI, viii*
	230–9	R&T41	3B*–3C*	VI, viii*–ix*
	240–8	GW39	3C*	VI, ix*
	249	R&T41	3C*	VI, ix*
	250–1	GW39	3C*	VI, ix*
	252	R&T41	3C*	VI, ix*

different papers, the length of the gatherings, and other evidence of rewriting, enable one to reconstruct some details of the process of composition. Among the signs of rewriting one may note that Mill evidently did not intend to use section divisions originally, but added them fairly late in the rewriting, probably before the original submission of the manuscript to Murray. Often the section number is quite obviously squeezed into a paragraph indentation (sometimes subsequent to an earlier revision). In other places, where there is rewriting on the verso, a section number appears with no evidence that it was added later; presumably before that stage (or at that stage) of the rewriting Mill had decided on sectioning. In the final revisions further alterations in section divisions were made, as cancellations demonstrate.

It does not seem possible to date the inks or pens; all that can safely be said is that *prima facie*, as one would expect, there are many revisions current with the first inditing of the manuscript (even though it presumably was adapted from an earlier, not extant, manuscript), and that later revisions were made not in isolated single passages, but in a more thorough way. The judgments based on a closer look at particular passages support the other evidence (placing and kind of revision, short pages, cancellations that do not continue from the end of one page to the next, etc.), and have been taken into account in the description of the process of revision in the Textual Introduction.

Given our attempt in this edition to give all substantive variant readings, it may seem odd to some that we do not give manuscript cancellations. Whatever one's desires, however, a glance at any of the heavily revised folios of the manuscript conclusively demonstrates the impracticability of such a practice. Even an extended reproduction of the longer cancellations would be inutile, especially because intelligibility demands parallel presentation of the various levels. It is appropriate, however, to give some examples of rewritten passages, with the sole intention of illustrating various kinds of revision. They should not be taken as indications of the relative importance, complexity, or density of the revisions.

There are relatively few places in the final manuscript where Mill cancelled a passage without replacing it; two of these may be taken as illustrative. The first, a deleted paragraph (MS Vol. IV, f.129; cancelled between the para-

MS VOL.	FOLIOS	PAPER	GATHERINGS	TEXT
IV (cont.)	253–5	GW39	3C*	VI, ix*
	256–8	R&T41	3D*	VI, x*
	259–60	GW39	3D*	VI, x*
	261–6	R&T41	3D*	VI, x*
	267–9	GW39	3D*	VI, x*
	270–6	R&T41	3D*	VI, x*
	277	GW39	3D*	VI, x*
	278–83	R&T41	3D*	VI, x*
	284–94	GW39	3E	VI, xi

graphs on p. 827 above), shows two stages of composition before the cancellation.[9] The first reading is:

I am not attempting to stigmatize any fair attempt to shew that certain of the feelings & opinions of mankind on moral subjects are the result of artificial & casual [?] associations, while certain others cannot be so accounted for, but must be part of the original formation of the mind. Whether this can be really the fact or not, the enquiry into it is legitimately within the scope of philosophy, but when the artificialness is implied from the mere fact of divergence however small the minority may be who diverge, that which ought to be proved is taken for granted, & the proceeding is justly chargeable with being a case of the fallacy under examination.

By cancellation and interlineation, Mill altered the passage to read:

I am not seeking to stigmatize any fair attempt to distinguish between moral opinions & feelings which proceed from artificial or casual associations, & others which cannot be so accounted for, but must be an original growth of the mind. Whether there be any such distinction or not, the enquiry into it is legitimately within the scope of philosophy. But to imply the artificialness from the mere fact of divergence however small the minority may be who diverge, is to commit the fallacy under examination, by taking for granted that which ought to be proved.

The following cancelled passage, one of the longest in the MS, occurs at the end of the second paragraph of Bk. V, Chap. 5, §5 (p. 792; MS Vol. IV, ff. 80–1):

But on these considerations it is the less necessary [?] that we should now dwell as they will occupy our attention very largely in the succeeding Book.

It is not only in social & moral science but in physical also, that empirical laws are apt to be viewed as ultimate laws of nature. An example of this is the celebrated doctrine of Nature's horror of a void. This proposition was not an unnatural generalization of some familiar appearances. But the tokens by which it might have been recognized as merely empirical, were abundantly conclusive. For the proposition could not mean that Nature was a sentient being actuated by motives & to whom a vacuum being literally unpleasant, she took care to interfere whenever there was any danger of so offensive a solution of continuity. The meaning, though much disguised by the highly abstract phraseology employed could only be that wherever there was any void space, or rather wherever there otherwise would have been a void space, the adjacent matter always pressed in & filled it, thus rendering a vacuum impossible. Take for instance the doctrine of Aristotle that there is no generation or corruption, beginning or end in the heavens: this could be but an empirical law, for it assigns no cause & yet the supposed fact which it asserts is one which must depend on causes. Another instance is the scholastic doctrine, adhered to even by Galileo, that Nature seeks her ends by the shortest road. Nature, doubtless whatever phrases might be used never was really considered, subsequently to the times of paganism, to be a living

[9]Here, and in almost all of the other examples, I ignore minor current cancellations (typically, one word cancelled and a substitute following immediately on the same line) in the interests of clarity and brevity.

being, or a cause in itself capable of producing effects; but as a mere general expression for the whole of the effects produced: the proposition therefore may be thus translated, "all effects are produced by the smallest employment of means which the general properties of matter allow of." Now this is not itself a law of causation, but a supposed resemblance existing among all laws of causation & as such is unsusceptible of any other induction than that by Simple Enumeration & is a mere empirical law. If, indeed, any cause were introduced to account for it, as the supposed purposes of the Creator, the case would be different, & the generalization would not be open to the imputation of erecting an empirical law into a law of nature. But it would be open to the imputation of being false.

The most frequent kind of rewriting, of course, is that which replaces single words and short phrases, with a view to clarity and precision. One such passage is interesting because of its content, and also because it comes at a place where the incompleteness of the first version demonstrates that a folio (or more) was cancelled and removed. The original wording, which concludes at the end of MS Vol. IV, f.207, was:

As justice & the love of truth enjoin that one should always grapple with the best & most reasonable form of any opinion one is contending against, we shall endeavour to the utmost of our power to make out as good a case for the chemical school of political speculation as its nature admits of & to

This was altered to:

As it is a rule both of justice & of good sense, to grapple, in preference, with the best & most reasonable form of any opinion, I will endeavour to make as good a case for the chemical school of political speculation as its nature admits of & to

Then the whole passage was cancelled, presumably along with its continuation on the next folio, and another folio was substituted, beginning with a new paragraph, the second sentence of which is the final version:

It is a rule both of justice & of good sense to grapple not with the absurdest but with the most reasonable form of a wrong opinion. (MS Vol. IV, f.208; p. 880 above.)

Examples of this kind occur on virtually every folio of the manuscript, and need not be exemplified at length, though one more typical illustration of Mill's concern for the correct degree of qualification may be useful. In describing Victor Cousin's lectures on Locke, Mill finally settled on this wording (MS Vol. IV, f.50; p. 770[e–e] above): "which as a *resumé* of the objections of the opposite school to that great man's doctrines is a work of eminent merit"; originally "all" appeared before "the objections", and "eminent merit", which originally read "extraordinary merit", in an intermediate stage read "unrivalled merit".

Two passages may be cited as of potential interest to students of Mill's moral philosophy. The opening sentence of Bk. VI, Chap. xii, §2 (pp. 943–4 above), went through some intricate revision, including many current can-

cellations that did not lead to complete syntactical units. What he first wrote, however, may be reconstructed thus: "In doing this" (i.e., characterizing the general method of Art, as distinguished from Science) "it is necessary to commence by making a distinction according as we are bound"; he then broke off, and tried to substitute "between two different" for the last five words, and broke off again, beginning there a new sentence, starting "In some cases we are bound to conform our practice to a preestablished rule; in others it is part of our task to find the rule, by which we are to govern our conduct." The final version, again involving current cancellations not here given, reads: "In all branches of practical business there are cases in which an individual is bound to conform his practice to a preestablished rule, while there are others in which it is part of his task to find or construct the rule, by which he is to govern his conduct." (MS Vol. IV, f.284.)

The second passage has a relation to the much debated question of Mill's quantity-quality distinction in *Utilitarianism*. In his discussion (p. 73 above) of the difference between water and wine, Mill's final manuscript reading of one sentence is: "In the first case however we say that the difference is only in quantity; in the last, there is a difference in quality, while the quantity of the water & of the madeira is the same." This sentence originally concluded "there is a difference in quality, but none in quantity" and the passage continued with the following sentences, which were currently cancelled:

What leads us to make this distinction? If we reflect we shall find it to be this: we think that the gallon of water, without being itself altered in any respect, may by merely *adding* to it something exactly like itself, be made precisely to resemble the ten gallons; while by no such process could a gallon of water be made precisely similar to a gallon or to ten gallons of madeira. The same principle extends to all other cases. I say I have the same pain which I had yesterday, but a greater quantity, or which is an equivalent expression, the same degree of it; if I say this it is assuredly because I feel as if the pain I have today might be produced by adding to the pain I had yesterday other sensations of pain exactly similar to it: but if there be anything in my sensations today that I cannot figure to myself as being so produced, I say I have now a different *kind* of pain; there is a difference of quality & not merely of quantity. Or I may reverse the matter, & say that by taking away a part of the sensation or of the object, what is left is less in quantity than that of which it is the remnant. (MS Vol. I, ff. 96–7.)

It is a matter of regret that Mill never developed his thoughts on the Science of Ethology that he sketches in Bk. VI, Chap. v. A cancelled paragraph (replaced by the first paragraph of §6, pp. 872–3 above) suggests one line of approach that might well have been interesting. Having compared the current states of development in Psychology and Ethology, he says:

The object of Psychology is to ascertain what are the simple elements of which the human mind is composed, & the laws which connect these with outward circumstances, either as causes or as effects. The most familiar of the simple ele-

ments of the mind are simple sensations. These are produced by outward objects & by the inward action of the bodily organization. So far however, if not probable, that [*sic*] at least the instincts of animals & that portion of human nature which corresponds to them, may be found to have as positive, & perhaps as direct a connexion with peculiarities of nervous organization, whether cerebral or otherwise, as any of our mere sensations have. It is certain that no mode has been suggested in which these instincts can receive any satisfactory explanation from psychological causes alone. (MS Vol. IV, ff. 195–6.)

(It is possible that the confused syntax of the fourth sentence, which bridges the two folios, indicates that a full folio was cancelled and extracted at this point.)

There is almost no limit to the number of examples that might be chosen to illustrate different points. For instance, the discussion of Coleridge's distinction between the "conceivable" and the "imaginable," which eventually appeared in Bk. V, Chap. iii, §3 (p. 755[e]), originally was a heavily revised note to Bk. II, Chap. v, §1 (p. 225; MS Vol. I, f.296v); and at MS Vol. I, f.290 (p. 220), a cancelled passage concerning the effect of acids and alkalis on vegetable substances suggests yet another intervention by Bain to correct a scientific example. Unfortunately, consultation of the manuscript remains essential for those interested in specific passages that may have been rewritten. To substantiate the earlier assertion that full reproduction is impossible, here is one example, certainly not among the most complicated.

In the reconstruction, the final version is given in boldface; italic type indicates current cancellations during both the original composition and the rewriting that did not produce coherent syntax; and roman type indicates cancellations in the rewriting.

In those
In all **subjects which are at** *one* **the same time familiar & complicated, &**

so much
especially *in that which is both* **on those which are** both those in so

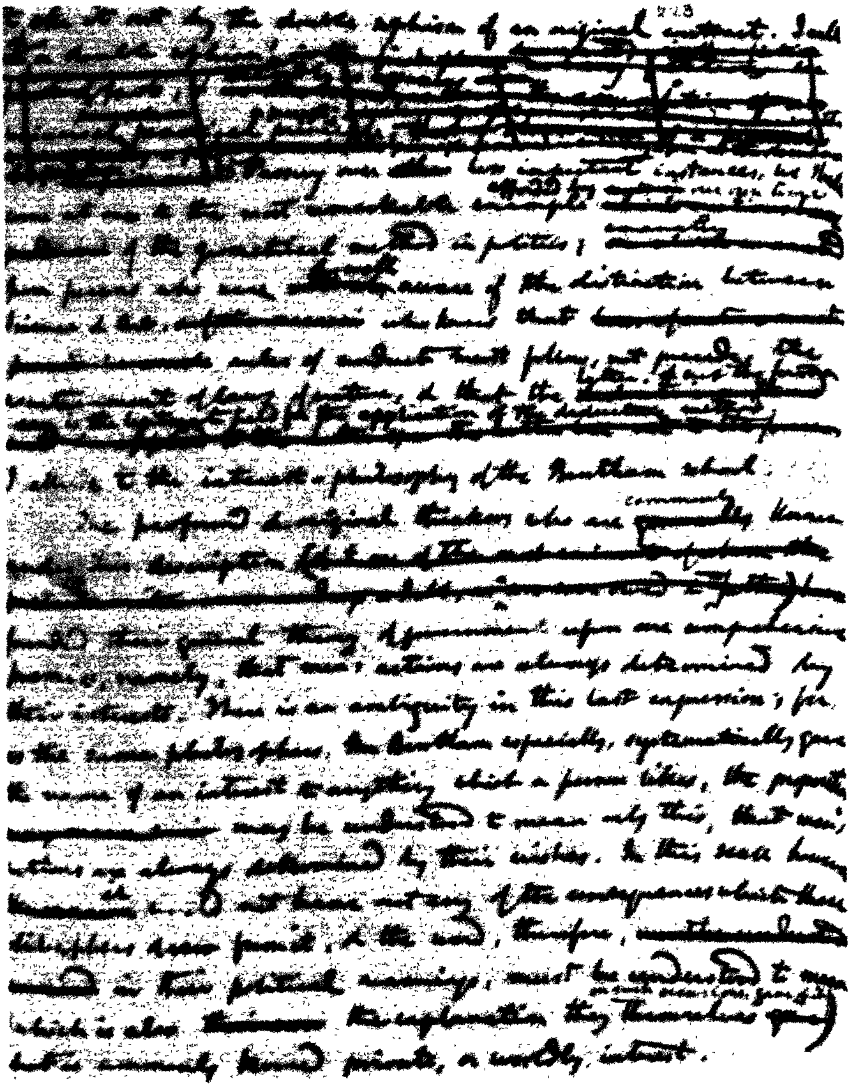
so as **of both these things as** **subjects are, it**
high a degree as the **moral & social** *phenomena* **is matter of**

common remark how many of the **important propositions are believed**

no account could be given and
& repeated from habit, while ^ **no sense is practically manifested** & no

account could be given **of the truths which they convey.**

Reconstructed, the process probably was as follows: Mill first wrote "In all subjects which are at one" (cancel "one") "the same time familiar & com-



Folio from Book VI, Chapter v, of the Press-copy Manuscript
British Museum

plicated, & especially in that which is both" (cancel "in that which is both") "on [*sic*] those which are both those in so high a degree as the moral & social phenomena" (cancel "phenomena" and interline the next three words) "subjects are, it is matter of common remark how many of the important propositions are believed & repeated from habit, while no sense is practically manifested & no account could be given of the truths which they convey." In the later rewriting, Mill cancelled "In all" and interlined "In those"; cancelled "both those in so high a degree as" and interlined "so much so as"; then cancelled the interlined "so as" and the original "the" before "moral", and interlined "of both these things as"; cancelled "of the"; and by cancellation and interlineation altered "no sense is practically manifested & no account could be given" to "no account could be given and no sense is practically manifested". The final reading is, then: "In those subjects which are at the same time familiar & complicated, & especially on those which are so much of both these things as moral & social subjects are, it is matter of common remark how many important propositions are believed & repeated from habit, while no account could be given and no sense is practically manifested of the truths which they convey." (MS Vol. III, f. 297; p. 681 above.)

It must be realized that even such a complex and unsatisfactory reconstruction would be further complicated by the introduction of the variants in the printed versions. In this case the slip of the pen ("on") was corrected to "in" in all the editions; "so much of both these things" became "both these things in so great a degree" in the 2nd edition, and "so in as great a degree" in the 3rd and subsequent editions; and an "a" appears before "matter of common remark" in the final three editions.

Trusting that the inutility of such a reproduction has been demonstrated, let us close with a brief example of a rather different kind.

It is often (and correctly) asserted that Mill is a highly impersonal writer, and what evidence there is of his manuscript revisions (most notably in the "Early Draft" of his *Autobiography*) indicates that he strove for this impersonality. One cancellation in the *Logic*, illustrated in the facsimile opposite, helps bear out the assertion. The passage occurs where, in Bk. VI, Chap. v (p. 890 above), Mill turns to a discussion of the "interest-philosophy of the Bentham school." As will be seen, Mill altered "generally" to "commonly", and deleted the following: "(& to one of the most eminent of whom the present writer owes as deep a debt, as a son ever owed to a father) have", interlining the two "a"s before cancellation.

Appendix K

Bibliographic Index of Persons and Works cited in the *Logic*, with Variants and Notes

MILL, like most nineteenth-century authors, is very cavalier in his approach to sources, often not identifying them with sufficient care, and very frequently quoting them inaccurately. This Appendix is intended to help correct these deficiencies, and also to serve as an index of names and titles (which are consequently omitted in the Index proper). The material is arranged in alphabetical order, with an entry for each author and work quoted or referred to in the *Logic* and in Appendices A–H. References to the "Early Draft" (Appendix A) and to the other Appendices are in italic; when the reference in the "Early Draft" corresponds to one in the final text, the reference to the "Early Draft" appears in parentheses immediately following the equivalent reference in the final text; when the reference in the "Early Draft" is not paralleled by a reference in the final text, the reference is given in normal sequence, separated by a semicolon from the other entries.

The entries take the following form:

1. Identification: author, title, etc., in the usual bibliographic form.
2. Notes (if required) giving information about JSM's use of the source, and any other relevant information.
3. A list of the places in the *Logic* where the author or work is quoted, and a separate list of the places where there is reference only.
4. A list of the substantive variants between the *Logic* and the source, in this form: Page and line reference to the Logic. Reading in the *Logic*] Reading in the source (page reference in the source).

The list of substantive variants also places quoted remarks in their contexts by giving the beginnings and endings of sentences. Omissions of two sentences or less are given in full; only the length of other omissions is given. Following the page reference to the source, cross-references to substantive variants within editions (i.e., those recorded in footnotes to the present text) are given, where applicable. (These help identify places where inaccuracies may be blamed on the printer; in a few places the inaccuracies are accepted

as typographical errors, and so noted.) Only surnames are given in cases of simple reference. Translated material is given in the original language.

ARANDA. Referred to: 940

ARCHIMEDES. Referred to: 760

NOTE: the reference is in a quotation from Playfair.

ARFWEDSON. Referred to: 427

NOTE: the reference is in a quotation from Herschel.

ARISTOTLE. Referred to: 46, 48n, 60n, 79 (*970–1*), 95, 111n, 144 (*1046*), 566, 658n, 678, 788, 802, 938; *1043*

NOTE: the reference at 658n is in a quotation from Whewell.

——— *The "Art" of Rhetoric.* (Greek and English.) Tr. J. H. Freese. London: Heinemann; New York: Putnam's Sons, 1926.

NOTE: this ed. used for ease of reference. The quotation occurs in a passage from Whately.

QUOTED: 828

——— *De Anima.* (Greek and English.) Tr. R. D. Hicks. Cambridge: Cambridge University Press, 1907.

NOTE: this ed. used for ease of reference.

REFERRED TO: 365n

——— *De Coelo.* (Greek and English.) Tr. W. K. C. Guthrie. London: Heinemann; Cambridge, Mass.: Harvard University Press, 1939.

NOTE: this ed. used for ease of reference. The reference at 761 is in a quotation from Whewell.

QUOTED: 798 REFERRED TO: 761

——— *Metaphysics.* (Greek and English.) 2 vols. Ed. Hugh Tredennick. London: Heinemann; New York: Putnam's Sons, 1933, 1935.

NOTE: this ed. used for ease of reference. The reference at 761 is in a quotation from Whewell.

QUOTED: 365–6; *1112n* REFERRED TO: 761

——— *Organon.* Ed. Harold P. Cooke and Hugh Tredennick. London: Heinemann; Cambridge, Mass.: Harvard University Press, 1938.

NOTE: this ed., which includes *The Categories, On Interpretation,* and the *Prior Analytics,* is used for ease of reference.

——— *The Categories.*

REFERRED TO: 46 (*989*), 47n–48n, 77, 112n, 119 (*1030*); *990, 1002*

——— *Prior Analytics.*

QUOTED: 156 REFERRED TO: 171n

——— *Physics.* (Greek and English.) 2 vols. Tr. Phillip H. Wicksteed and Francis M. Cornford. London: Heinemann; Cambridge, Mass.: Harvard University Press, 1929, 1934.

NOTE: this ed. used for ease of reference. The quotation and references at 761–2 and 823 are in quotations from Whewell. Those at 762 and 823 are identical.

QUOTED: 761 REFERRED TO: 657, 761–2, 823

——— *Treatise On the Heavens.* See *De Coelo.*

ARNAULD, ANTOINE, and PIERRE NICOLE. *La Logique ou l'Art de penser : contenant outre des règles communes, plusieurs observations nouvelles, propres à former le jugement.* Dernière édition. Amsterdam: Wolfgank, 1775.

NOTE: this ed. in JSM's library, Somerville College, as is the translation by Thomas Spencer Baynes, *The Port-Royal Logic.* 3rd ed. Edinburgh: Sutherland and Knox, 1854.

REFERRED TO: 5 (*962*)

ARNOTT. Referred to: 480, 498n

AURELIUS. *See* Antoninus.

AVERROES. Referred to: 938

AVICENNA. Referred to: 938

BACON, FRANCIS. Referred to: cxii, 305, 313, 433, 482, 835, 879–80, 886

——— *De Augmentis Scientiarum.* In *The Works of Francis Bacon.* 14 vols. Ed. James Spedding, Robert Leslie Ellis, and Douglas Denon Heath. London: Longman, *et al.*, 1857–74, I, 415–840.

NOTE: for ease of reference this ed., which is in JSM's library, Somerville College, is used, though JSM's references antedate it. Most of JSM's phrasal quotations are paraphrases, and that at 312 is undoubtedly summary, so no collation is given; the phrase "*per enumerationem simplicem*" appears in *Novum Organum, Works,* I, 205.

QUOTED: 312 (*1109*)

REFERRED TO: 10 (*965*), 312 (*1109*), 381, 763–5

——— "Filum Labyrinth, sive formula inquisitionis." In *The Works of Francis Bacon*. 14 vols. Ed. James Spedding, Robert Leslie Ellis, and Douglas Denon Heath. London: Longman, *et al.*, 1857–74, III, 493–504.

NOTE: for ease of reference, this ed., which is in JSM's library, Somerville College, Oxford, is used. The quotation is indirect; the same image is used in "Of the Interpretation of Nature," *ibid.*, 227.

QUOTED: 801

——— "Of the Interpretation of Nature." In *The Works of Francis Bacon*. 14 vols. Ed. James Spedding, Robert Leslie Ellis, and Douglas Denon Heath. London: Longman, *et al.*, 1857–74, III, 215–52.

NOTE: For ease of reference this ed., which is in JSM's library, Somerville College, is used. The quotation is indirect; the same image is used in "Filum Labyrinth," *ibid.*, 503.

QUOTED: 801

——— *Novum Organum*. In *The Works of Francis Bacon*. 14 vols. Ed. James Spedding, Robert Leslie Ellis, and Douglas Denon Heath. London: Longman, *et al.*, 1857–74, I, 119–365.

NOTE: for ease of reference this ed., which is in JSM's library, Somerville College, is used, though JSM's references antedate it. Also in his library is 2nd ed. Amsterdam: Ravensteiny, 1660. Most of the phrasal quotations are paraphrases, so no collation is given. JSM habitually, like other philosophers (e.g., Hume), uses Robert Hooke's term "*experimentum crucis*" for Bacon's "*instantia crucis*"; see under Hooke, below.

QUOTED: 312 (*1109*), 313 (*1109*), 660, 661, 763, 776, 788, 802; *1077n*

REFERRED TO: 254 (*1093*), 272, 382, 582–3, 677, 763–5, 769, 870–1, 872n, 875

763.2–4 "Calorem . . . posse:" . . . "Compositionem] Hinc opiniones illæ in activa et operativa parte; calorem . . . posse. Hinc illud: compositionem (184)
776.19 "Is] Quinetiam licet abfuerit ea quam diximus delectatio et vanitas, is (166)
788.15 "Inductio quæ] Inductio enim quæ (205)
788.22 concludere."] concludere; quod adhuc factum non est, nec tentatum certe, nisi tantummodo a Platone, qui ad excutiendas definitiones et ideas, hac certe forma inductiones aliquatenus utitur. (205)
802.8–9 *temere . . . abstractae,*] Aut enim sunt rerum nomina quæ non sunt (quemadmodum enim sunt res quæ nomine carent per inobservationem, ita sunt et nomina quæ carent rebus per suppositionem phantasticam); aut sunt nomina rerum quæ sunt, sed confusa et male terminata, et temere . . . abstractæ. [*JSM's italics*] (171)
802.11 "Invenietur] Exempli gratia, accipiatur aliquod verbum (*Humidum*, si placet), et videamus quomodo sibi constent quæ per hoc verbum significantur; et invenietur (171)
802.17 quum] cum (171) [*JSM's reading occurs in other eds.*]
1077.n2 "qui naturam rei in ipsa re perscrutantur"] Nemo enim alicujus rei naturam in ipsa re fœliciter perscrutatur, sed amplianda est inquisitio ad magis communia (I, 180)

——— *Logic*. 2 Parts. London: Longmans, Green, Reader, and Dyer, 1870.

NOTE: the quotations at 100n (the first quotation), 166n (the first syllogism), and 227n are indirect.

QUOTED: 38n, 47n–48n, 76n, 85n, 86, 95n, 100n–101n, 104, 141n–142n, 166n–167n, 181n–182n, 227n, 236, 279n, 375n, 377n, 448n–449n, 451, 453n, 487n–488n, 577, 589n, 676n REFERRED TO: cxvii 41n, 81, 159n, 352, 353, 587, 948n.

47.n1 "The] [*paragraph*] The (I, 265)
48.n4 predication.] predication, including Verbal as well as Real predication. (I, 265)
48.n6 or other] or any other (I, 265)
76.n1–2 "points . . . among classes."] [*section 8*] General Names are said to be *Connotative*; that is, they denote objects, and *connote* or imply attributes, or points . . . among objects. (I, 49)
85.n3 "the contrast] [*paragraph*] The reason why "Universal" and "Particular" are not suitable names, for the two modes of quantity, is that these names designate also the inductive contrast (I, 82)
86.2 "with] The chief examples [of Indefinite forms of the proposition] occur with (I, 82)
86.8 metal.] metal collectively. (I, 83)
95.n2 "the] But the word "class" has two meanings—the (I, 50)
95n.4 planets . . . . The] [*ellipsis indicates 4-sentence omission with paragraph break before* The] (I, 50)
95n.6 virtuous . . . . In] [*ellipsis indicates 5-sentence omission with paragraph break before* In]
101n.1 "are] Indeed, all such propositions [as predicate Existence] are (I, 107)
101n.5 and succession] and of succession (I, 107)
101n.10 concrete form] correcter form (I, 107) [*treated as typographical error*]
101n.16 "fictitious and unmeaning language"] Indeed, when we talk of these two departments [the portions of knowledge called the *Object* world and the *Subject* world] as dividing between them the universe of existence, we are using fictitious and unmeaning language; the ultimate universe, according to the law of Relativity, is a *couple*; the highest *real* grouping of things is this *two-fold* grouping, called Object and Subject, &c. (I, 255–6) [*The remark referred to by JSM at* 100.n1 *occurs in the second sentence following*.]
104.21 "This] [*paragraph*] This (I, 105)
104.27 substance . . . . The] substance. Every blood corpuscle has a plurality of relations, indivisible and inseparable. [*paragraph*] The (I, 105)
104.29–30 exercise. The] exercise. Every pleasurable feeling has its power of acting on the will and of impressing the memory; all the attributes are joined in the unity of the mental being. [*paragraph*] A wide range of Scientific knowledge is comprised under the present head. The (I, 105)
141.n2 "the] The (I, 71)
141.n8 each,"] each. (I, 75)
166.n6 Socrates is wise,/Socrates is poor, therefore] Socrates is poor/Socrates is wise (I, 159)
166.n9 "one . . . wise." "Now [*paragraph*] Properly, the conclusion is, "*one* . . . wise." Now (I, 159)
167.n16 "a single *meaningless*] One form [of the Singular Name], exhibited in the above examples, is a single meaningless (I, 48)
181.n3 "unworkable] [*paragraph*] Notwithstanding so many advantages, this form of the axiom now described is unworkable (I, 157)
181.n8 at once] whence (I, 157) [*treated as typographical error*]
181.n8 A carries C] A carries B (I, 157) [*printer's error in* Source?]

182.24 "The] [*paragraph*] It is only the same objection, otherwise put, that the (I, 158)

236.12 conclusion. . . . When] conclusion. When we know a fact, we know it, even when called by another name, which is all that is meant, at present, by necessary truth. When (I, 222)

236.14 affirmation that two . . . space. No] affirmation, "two . . . space." [*paragraph*] No (I, 222)

236.15 in such cases. . . . We] for such cases. Our ordinary intellectual powers enable us to pronounce, in more than one form, that an object is everything or anything that we have found it to be. We (I, 222)

236.21 "the] It [the *dictum de omni et nullo*] is not intelligible without much familiarity with examples of the generalizing process; and, as, in the case of all other first principles, the (I, 226)

279.n2–3 "everything . . . affirmation;"] By the law of Relativity, every thing . . . affirmation; to the thing that we call a 'straight' line, there corresponds a negative or opposite called a "bent" or crooked line. (I, 16)

375.n2–4 "The . . . solid;"] [*paragraph:*] Many other laws might be cited:—The celebrated law of Berthollet, regarding the double decomposition of salts; the . . . solid. (II, 254)

448.n4 alone: a cause] alone, and cause (II, 83)

448.n6 these] those (II, 83)

448.n7 direction. The] direction. [*paragraph*] The (II, 83)

449.n2 variations] variation (II, 83)

449.n3 attractive] attracting (II, 83)

449.n3 bodies. By] bodies. [*paragraph*] By (II, 83)

449.n4 nitrogen from] nitrogen in (II, 83)

451.23–24 "quinine . . . oil,"] The Specifics that have been discovered for particular diseases, as quinine . . . oil, are affirmed as independent facts, resting on no deductive inferences from Cause and Effect in Disease, but on the experience of their efficacy. (II, 360)

453.n4 "when] This source of ambiguity [from the many unseen operations effecting change] is practically overcome when (II, 336)

453.n5 changes,] change; (II, 336)

453.n6 day by] day with (II, 336)

487.n2 "scientific . . . Induction,"] [*section 6*] Scientific . . . Induction. (II, 121)

487.n4 "the] [*section 7*] The (II, 121)

487.n5 facts. Induction] facts. [*paragraph*] Induction (II, 121)

488.n5 agency. . . . If] agency [*paragraph*] So remarkable have been the achievements of modern times, in the direction of lofty generalities, that some countenance seems to be lent to the ancient dream of attaining an ultimate centralized unity in the midst of the seeming boundless diversity of nature. [*paragraph*] It depends purely on actual investigation, how far all phenomena are resolvable into one or into several ultimate laws; whether inductive finality leaves us with one principle, with two, or with twenty principles. [*paragraph*] Thus, if (II, 121)

577.24 "leap in the dark"] It is always more congenial to make leaps in the dark, than to abide strictly by what we actually know. (II, 378)

589.n3 "the] [*paragraph*] With an exception to be noticed presently, these are perhaps the (II, 13)

589.n5 "a law connecting] [*sub-section 1*] A law has been discovered connecting (II, 13)

589.n7 product. The] product. Thus, for sulphur, the atomic weight (32), multiplied by the specific heat (0.1776), gives 5.68; the atomic weight of platinum (197), multiplied by its specific heat, (0.0324), gives 6.38. The (II, 13)

589.n9 "between] [*sub-section 2*] A law obtains between (II, 13)

589.n10 weights. The] Weights. Thus, the specific gravity of oxygen is 16, its atomic

weight 16; hydrogen, specific gravity 1, atomic weight 1; phosphorus, specific gravity 62, atomic weight 31 (the relation here is 2 to 1); steam, specific gravity 9, atomic weight 18 (relation of 1 to 2). The (II, 13)

589.n10 is in] is thus, in (II, 13)
676.n7 "The] [*paragraph*] The (II, 173)
676.n8 hum'd] husnid [*sic*] (II, 173)
676.n12 further] farther (II, 173)
676.n15 containing water] containing no water (II, 173) [*treated as typographical error in text above, and so corrected*]
676.n19 unpaved. "Impertinent"] unpaved. [*paragraph*] Impertinent (II, 174)

——— *The Senses and the Intellect*. London: Parker, 1855.

NOTE: the 3rd ed. (London: Longmans, 1868) is in JSM's library, Somerville College.

REFERRED TO: 62n, 410n, 853

BENTHAM, JEREMY. Referred to: 876n, 890

——— *The Book of Fallacies*. London: Hunt, 1824.

NOTE: in *Works*, ed. John Bowring. Edinburgh: Tait, 1843, II. The work was edited by Peregrine Bingham. The term quoted at 742 is the title of Part IV, "Fallacies of Confusion"; those quoted at 695 and 823 derive from the title of chap. i, "Question-Begging Appellatives," of Part IV.

QUOTED: 695, 742, 823

——— *A Fragment on Government; being an examination of what is delivered on the subject of government in general in the introduction to Sir William Blackstone's Commentaries; with a preface, in which is given a critique on the work at large*. London: Payne, 1776.

NOTE: in *Works*, ed. John Bowring. Edinburgh: Tait, 1843, I.

REFERRED TO: 732

——— *Rationale of Judicial Evidence, specially applied to English Practice*. Ed. J. S. Mill. 5 vols. London: Hunt and Clarke, 1827.

NOTE: in JSM's library, Somerville College. In *Works*, ed. John Bowring. Edinburgh: Tait, 1843, VI & VII. The quotations are indirect; the passage referred to at 627 concludes with a long note by JSM.

QUOTED: 598, 627

BENTLEY. Referred to: 754

BERKELEY, GEORGE. Referred to: 58, 59 (*994*), 203, 203n, 649, 829–30; *1020, 1088*

NOTE: the reference at 203 is in an indirect quotation from Herschel; JSM's comment (203n) that the doctrine is not in Berkeley would appear to be correct.

BOE. Referred to: 793

NOTE: the reference is in a quotation from Paris.

BORDA. Referred to: 405

BOSWELL, JAMES. *Life of Johnson.* Ed. George Birkbeck Hill and L. F. Powell. 6 vols. Oxford: Clarendon Press, 1934.

NOTE: the reference is simply to Johnson's "refutation" of Berkeley at I, 471; this ed. used for ease of reference.

REFERRED TO: 829

BOWEN, FRANCIS. *Lowell Lectures, on the Application of Metaphysical and Ethical Science to the Evidences of Religion.* Boston: Little and Brown, 1849.

QUOTED: 354, 356n

354.12–13 "of . . . causative."] Thus, if I will to move a limb which has been paralyzed, though the limb does not move, I am conscious of making an effort to move it, and this consciousness of effort is a consciousness of . . . causative, though in this instance too weak, or too little, for the end proposed. (84)

354.24 agent. Let] agent; we cannot speak of the *doings* of matter, as we could if the word *action* were applicable to it in any other than a figurative sense. Let (88)

354.25 matter."] matter,—a stone, for instance,—except this merely negative one, that it always and necessarily remains in its present state, whether this be of rest or motion. (88)

356.n11–13 "In . . . experience."] But in . . . experience; the volition succeeds, which is a true effort, or a power in action; and this, if the power be sufficient, is *necessarily* followed by the effect. (85)

BRAHE. Referred to: 652

BRANDIS, CHRISTIAN AUGUST. *Handbuch der Geschichte der Griechisch-Römischen Philosophie.* Vol. I. Berlin: Reimer, 1835.

NOTE: it is likely that George Grote supplied JSM with this reference. In his copy of Brandis (University of London Library), Grote has written "X Thales conceived ψυχή as = motive power" at the top of 119. (Cf. note to Preller and Ritter, *Historia,* below.)

QUOTED: 364

364.28 "augenscheinlich . . . berichten;"] Cicero, nachdem er an einer Stelle jene Worte als Ermahnung zur Frömmigkeit gefasst wiedergegeben, legt an einer andern Stelle augenscheinlich . . . berichten, dem Thales die Annahme eines göttlichen Geistes bei, der aus dem Wasser Alles bilde: wogegen die lehre von der Weltseele ihm von Griechischen Schriftstellern zugeeignet wird. (118–19) [*footnotes omitted*]

Bridgewater Treatise. See Chalmers, and Prout.

from Lecture x, "On the Influence of the Nervous System upon Nutrition and Secretion. . . ."

QUOTED: 476–7

——— "On the Relations between Muscular Irritability, Cadaveric Rigidity, and Putrefaction," *Proceedings of the Royal Society of London*, XI (1860–62), 204–14.

NOTE: the Croonian Lecture, delivered 16 May, 1861.

QUOTED: 421, 422, 424, 425 REFERRED TO: 421–5

422.2 "comparing] I have ascertained this fact in various ways; but the most decisive method consists in comparing (205)
422.4 "often] I have often (205) [*this sentence follows immediately on the one last quoted*]
424.17 "death] Death (208)
424.20 in the brain;"] of the brain. (208)
424.23 "a] But lightning may kill in another way: it may destroy life as galvanism does, by producing such a (208)
424.24–5 body," . . . "muscular] body that muscular (208)
424.25 once."] once; and the ensuing rigidity may then be of so short duration as to escape notice. (208)
425.15 "That] The facts I have mentioned show that (213)
425.21 slowly:" but "that] slowly. The facts mentioned also clearly show that (213)

BUCKLE, HENRY THOMAS. *History of Civilization in England.* 2 vols. London: Parker and Son, 1857, 1861.

QUOTED: 933 REFERRED TO: 931–2, 934–5, 935n–936n

BUNSEN. Referred to: 408

NOTE: the reference is in a quotation from Liebig.

BUTLER, JOSEPH. *The Analogy of Religion, Natural and Revealed, to the Constitution and Course of Nature. To which are added two brief dissertations: I. Of Personal Identity. II. Of the Nature of Virtue.* London: Knapton, 1736.

REFERRED TO: 630

CAESAR, JULIUS. Referred to: 321n, 605, 749, 937, 941; see also Suetonius.

NOTE: the references at 941 are in quotations from Stephen.

CAMPBELL, GEORGE. *A Dissertation on Miracles: containing an Examination of the principles advanced by David Hume, Esq; in an Essay on Miracles.* Edinburgh: Kincaid and Bell, 1762.

REFERRED TO: 631

CANDOLLE, AUGUSTIN PYRAMUS DE. *Théorie élémentaire de la botanique, ou exposition des principes de la classification naturelle et de l'art de décrire et d'étudier les végétaux.* 2nd ed. Paris: Deterville, 1819.

NOTE: the translated quotation appears in a quotation from Whewell's *History of Scientific Ideas*; as JSM follows Whewell's translation, no collation is given.

QUOTED: 700

CAPEL, GEORGE. Letter to Mill. A.l.s., 3 November, 1866, British Library of Political and Economic Science (London School of Economics), Mill–Taylor Collection, I, 98.

QUOTED: 935n–936n

935.n4–936.n2 "In . . . alone,"] [*paragraph*] Now to do what he [Buckle] might to ascertain this order [of human progression], was what he addressed himself to, and in . . . alone. (f.2v)
936.n4 "He desired] He claimed (f.3r)

CARLYLE, THOMAS. "Characteristics," *Edinburgh Review*, LIV (Dec., 1831), 351–83.

NOTE: Mill disputed the matter in question ("we do not learn to use our muscles by studying their anatomy") with Carlyle, and so, though there is no direct reference to Carlyle in the passage, the reference to his "Characteristics" is given. He says, e.g., "Is it the skilfullest Anatomist that cuts the best figure at Sadler's Wells? or does the Boxer hit better for knowing that he has a flexor longus and a flexor brevis?" (355)

QUOTED: 13

——— "Corn Law Rhymes," *Edinburgh Review*, LV (July, 1832), 338–61.

QUOTED: 800n

800.n2 "strength does not] Strength, if that be the thing aimed at, does not (351)

——— "Novalis." In his *Critical and Miscellaneous Essays*. 5 vols. London: Fraser, 1840, II.

NOTE: this ed. probably was in JSM's library, Somerville College. The quotation is from Novalis, but as there can be little doubt that JSM took the passage from Carlyle, it is entered here. It is found in the ed. Carlyle used, Ludwig Tieck and Friedrich Schlegel, eds. *Novalis Schriften*. 2 vols. Berlin: Realschulbuchhandlung, 1805, II, 336.

QUOTED: 843

843.3 will:"] will (*vollkommen gebildeter Wille*). (242) [In Novalis the full sentence is: "Ein Charakter ist ein vollkommen gebildeter Wille."]

CARPENTER, WILLIAM BENJAMIN. *Principles of General and Comparative*

Physiology, intended as an introduction to the study of human physiology, and as a guide to the philosophical pursuit of natural history. London: Churchill, 1839.

NOTE: the 2nd ed. (London: Churchill, 1841) was reviewed by JSM in the *Westminster Review*, XXXVII (Jan., 1842), 254.

REFERRED TO: 374n; *1121n*

——— *Principles of Human Physiology, with their chief applications to pathology, hygiene, and forensic medicine.* London: Churchill, 1842.

REFERRED TO: 374n

CATO. Referred to: 799, 824

NOTE: the reference at 824 is to Cicero's presentation of Cato in his *De finibus.*

CHALMERS, THOMAS. *On the Power Wisdom and Goodness of God as Manifested in the Adaptation of External Nature to the Moral and Intellectual Constitution of Man.* 2 vols. London: Pickering, 1833.

NOTE: Bridgewater Treatise I. The general title of the Bridgewater Treatises is *On the Power Wisdom and Goodness of God as Manifested in the Creation*; on the half-title page (where this appears), Chalmers' work is identified as *On the Adaptation of External Nature to the Moral and Intellectual Constitution of Man.*

REFERRED TO: 367n, 465

——— *On the Use and Abuse of Literary and Ecclesiastical Endowments.* Glasgow: Collins, 1827.

REFERRED TO: 703n

CHARES. Referred to: 941

CHARLES I (OF ENGLAND). Referred to: 778

CHARLES III (OF SPAIN). Referred to: 940

CHRIST. See Jesus.

CHILLINGWORTH. Referred to: 5n

CICERO. *De finibus bonorum et malorum.* Ed. H. Rackham. London: Heinemann; New York: Macmillan, 1914.

NOTE: this ed. used for ease of reference; the collations are not given, as there is no indication which ed. JSM used.

QUOTED: 771, 797, 812–13, 823–5

——— *De natura deorum.* Ed. H. Rackham. London: Heinemann; New York: Putnam's Sons, 1933.

NOTE: this ed. used for ease of reference; there is no indication of which ed. JSM used, but the collation is given to establish context.

QUOTED: 364

364.32–3 "Anaximenes . . . statuit."] Post Anaximenes . . . statuit, eumque gigni esseque inmensum et infinitum et semper in motu: quasi aut aer sine ulla forma deus esse possit, cum præsertim deum non modo aliqua sed pulcherrima specie deceat esse, aut non omne quod ortum sit mortalitas consequatur. (28; Bk. I, Chap. x)

CLAIRAUT. Referred to: 222

COLERIDGE, SAMUEL TAYLOR. Referred to: 685, 755n, 792n, 830

NOTE: the reference at 685 is too general for precise identification, but the substance is reflected in the MS passage on language included in Alice D. Snyder, *Coleridge on Logic and Learning* (New Haven: Yale University Press, 1929), 138.

——— *Aids to Reflection in the Formation of a Manly Character on the Several Grounds of Prudence, Morality, and Religion: Illustrated by select passages from our elder Divines, especially Archbishop Leighton.* 2nd ed. London: Hurst, Chance, 1831.

NOTE: the 1st ed. (London: Taylor and Hessey, 1825) is in JSM's library, Somerville College, but this is the edition cited in his "Coleridge"; both references are given in the collation below. See also the reference to *Biographia Literaria* at 755n, which might also refer to *Aids to Reflection*, 65.

QUOTED: 814

814.9–10 "the man . . . motive, not . . . man;" . . . "what] [*paragraph*] He needs only reflect on his own experience to be convinced, that the Man . . . *motive*, and not . . . Man. What (2nd ed., 59; 1st ed., 67)

——— *Biographia Literaria; or Biographical Sketches of My Literary Life and Opinions.* 2 vols. in 1. London: Rest Fenner, 1817.

NOTE: in JSM's library, Somerville College. The reference at 755n might also be to Coleridge's *Aids to Reflection*, 2nd ed., 65.

QUOTED: 770, 885 REFERRED TO: 755n

770.19 "evident truth," that "the] Yet the apparent action of each [soul and body] on the other pressed heavy on the philosopher on the one hand; and no less heavily on the other hand pressed the evident truth, that the (I, 129)
770.21 property," and therefore "cannot . . . opposite:"] property; and cannot . . . opposite. (I, 129)
885.4 whenever] wherever (I, 214) [*cf.* 885^{b-b}]
885.6 subtracting] substracting [*sic*] (I, 214)
885.8 different. As, for instance, in] different. In (I, 214) [*treated as typographical error; MS reading given in text*]

885.8 series of] series of* [*footnote omitted, giving Coleridge's identification of the articles as appearing in the* Morning Post and Courier, *and designed to appear in* The Friend] (I, 214–15)
885.10–11 Bourbons.' The] Bourbons," I feel myself authorized to affirm, by the effect produced on many intelligent men, that were the dates wanting, it might have been suspected that the essays had been written within the last twelve months. The (I, 215)

——— *Second Lay Sermon* [*Blessed are ye that sow beside all waters*]. 2nd ed. In *On the Constitution of Church and State, and Lay Sermons.* London: Pickering, 1839.

NOTE: in JSM's library, Somerville College. The same passage is quoted in JSM's "Coleridge," *Collected Works*, X, 155n.

QUOTED: 807

807.33 "which might be taken as a] Thus instead of the position, that all things find, it would be less equivocal and far more descriptive of the fact to say, that things are always finding, their level: which might be taken as the (403)

——— *The Friend: A series of Essays, in three volumes, to aid in the formation of fixed principles in politics, morals, and religion, with literary amusements interspersed.* 3 vols. London: Rest Fenner, 1818.

NOTE: in JSM's library, Somerville College.

QUOTED: 774–5

774.32–3 "which . . . Europe," viz., "Fortune favours fools."] "*Does* fortune favor fools? Or how do you explain the origin of the proverb, which . . . Europe?" (III, 269)
774.n4 "admits] [*paragraph*] This proverb admits (III, 269)
774.n4 explanations. . . . It] explanations according to the mood of mind in which it is used. It (III, 269)
774.34 "tendency] [see 774^{c-c}] (III, 270)
775.40 whole."] [see 775^{f}] (III, 277)

COLUMNA. Referred to: 700

NOTE: the reference is in a quotation from Whewell.

COLUMBUS. Referred to: 302n, 819

COMMODUS. Referred to: 197 (*1073*)

COMTE, AUGUSTE. Referred to: 341–2, 495, 504, 560n, 859, 915; *1142*

——— *Cours de philosophie positive.* 6 vols. Paris: Bachelier, 1830–42.

NOTE: in JSM's library, Somerville College. Vol. I (*Les Préliminaires généraux et la philosophie mathématique*) was published in 1830; Vol. II (*La Philosophie astro-*

nomique et la philosophie de la physique) in 1835; Vol. III (*La Philosophie chimique et la philosophie biologique*) in 1838; Vol. IV (*La Philosophie sociale et les conclusions générales: première partie*) in 1839; Vol. V (*La Partie historique de la philosophie sociale, en tout ce qui concerne l'état théologique et l'état métaphysique*) in 1841; and Vol. VI (*Le Complément de la philosophie sociale, et les conclusions générales*) in 1842. Comte's text is highly repetitive, and some of the references are therefore typical rather than specific.

QUOTED: 299, 488–9, 497, 621, 640, 832, 918–19 REFERRED TO: 284n, 375n, 393, 456n, 458n, 499, 504, 508n, 571n, 614n, 615–16, 619n, 620, 620n, 713n, 715, 726, 730n, 731n, 830, 851n, 895n, 897, 903n, 910n, 914n, 915, 915n, 917, 928, 929n, 930n, 942, 948, 948n, 950n; *1118–19*

299.4 "L'astronomie] Quoi qu'il en soit, on voit clairemont par là que l'astronomie (II, 202)

488.6–489.3 "evidently primordial" . . . "la . . . substance,"] Je veux parler des efforts, nécessairement illusoires, qu'on a si souvent tentés pour expliquer, soit par le système émissif, soit par le système vibratoire, le phénomène primordial, évidemment inexplicable, de la . . . substance." (II, 655–6)

489.3–6 "No . . . primordial?"] [*translated from:*] Personne n'entreprend plus aujourd'hui d'expliquer la pesanteur spécifique particulière à chaque substance ou à chaque structure. Pourquoi en serait-il autrement, quant à la couleur spécifique, dont la notion n'est pas, sans doute, moins primordiale?" (II, 656–7)

497.6–11 "Some . . . supposition."] [*translated from:*] Tel fait est encore peu connu, ou telle loi est ignorée: on forme alors à cet égard une hypothèse, le plus possible en harmonie avec l'ensemble des données déjà acquises; et la science, pouvant ainsi se développer librement, finit toujours par conduire à de nouvelles conséquences observables, susceptibles de confirmer ou d'infirmer, sans aucune équivoque, la supposition primitive." (II, 437–8)

497.12–15 "if . . . inquiry."] [*translated from:*] Or, l'une et l'autre [induction and deduction] voie seraient certainement insuffisantes, même à l'égard des plus simples phénomènes, aux yeux de quiconque a bien compris les difficultés essentielles de l'étude approfondie de la nature, si l'on ne commençait souvent par anticiper sur les résultats, en faisant une supposition provisoire, d'abord essentiellement conjecturale, quant à quelques-unes des notions mêmes qui constituent l'objet final de la recherche." (II, 434)

621.5 "at . . . inquiry:"] [*translated from:*] Il ne s'agirait néanmoins ici que de prolonger convenablement les réflexions que doivent naturellement suggérer les questions inorganiques susceptibles de solutions mathématiques, et dans lesquelles on voit, d'une manière si prononcée, ces solutions devenir graduellement plus difficiles et plus imparfaites à mesure que le sujet se complique davantage en rapprochant peu à peu l'état abstrait de l'état concret, à tel point que, au-delà des phénomènes purement astronomiques ou de leurs anologues les plus immédiats, une semblable perfection logique ne s'obtient presque jamais, comme nous l'avons constaté, qu'aux dépens de la réalité des recherches, même sans sortir des études générales de la physique proprement dit. (III, 414–15)

621.6–10 "notwithstanding . . . influences."] [*translated from:*] En effet, lors même que l'on supposerait exactement connues les lois mathématiques propres aux différentes actions élémentaires dont le concours détermine l'accomplissement des phénomènes vitaux, leur extrême diversité et leur multiplicité inextricable ne pourraient aucunement permettre à notre faible intelligence d'en poursuivre avec efficacité les combinaisons logiques, comme le témoignent déjà si clairement les questions astronomiques elles-même malgré l'admirable simplicité de leurs élémens mathématiques, lorsqu'on veut considérer simultanément plus de deux ou trois influences essentielles. (II, 415–16)

918.7–919.33 "making . . . another."] [*translated from:*] Ainsi conçue, cette sorte d'anatomie sociale, qui constitue la sociologie statique, doit avoir pour objet per-

manent l'étude positive, à la fois expérimentale et rationnelle, des actions et réactions mutuelles qu'exercent continuellement les unes sur les autres toutes les diverses parties quelconques du système social, en faisant scientifiquement, autant que possible, abstraction provisoire du mouvement fondamental qui les modifie toujours graduellement. Sous ce premier point de vue, les prévisions sociologiques, fondées sur l'exacte connaissance générale de ces relations nécessaires, seront proprement destinées à conclure les unes des autres, en conformité ultérieure avec l'observation directe, les diverses indications statiques relatives à chaque mode d'existence sociale, d'une manière essentiellement analogue à ce qui se passe habituellement aujourd'hui en anatomie individuelle. Cet aspect préliminaire de la science politique suppose donc évidemment, de toute nécessité, que, contrairement aux habitudes philosophiques actuelles, chacun des nombreux élémens sociaux, cessant d'être envisagé d'une manière absolue et indépendante, soit toujours exclusivement conçu comme relatif à tous les autres, avec lesquels une solidarité fondamentale doit sans cesse le combiner intimement. Il serait, à mon gré, superflu de faire expressément ressortir ici la haute utilité continue d'une telle doctrine sociologique: car, elle doit d'abord servir, évidemment, de base indispensable à l'étude définitive du mouvement social, dont la conception rationnelle suppose préalablement la pensée continue de la conservation indispensable de l'organisme correspondant; mais, en outre, elle peut être, par elle-même, immédiatement employée à suppléer souvent, du moins provisoirement, à l'observation directe, qui, en beaucoup de cas, ne saurait avoir lieu constamment pour certains élémens sociaux, dont l'état réel pourra néanmoins se trouver ainsi suffisamment apprécié, d'après leurs relations scientifiques avec d'autres déjà connus. L'histoire des sciences peut surtout donner, dès ce moment, quelque idée de l'importance habituelle d'un tel secours, en rappelant, par exemple, comment les vulgaires aberrations des érudits sur les prétendues connaissances en astronomie supérieure attribuées aux anciens Egyptiens ont été irrévocablement dissipées, avant même qu'une plus saine érudition en eût fait justice, par la seule considération rationnelle d'une relation indispensable de l'état général de la science astronomique avec celui de la géométrie abstraite, alors évidemment dans l'enfance; il serait aisé de citer une foule de cas analogues, dont le caractère philosophique serait irrécusable. On doit d'ailleurs noter, à ce sujet, pour ne rien exagérer, que ces relations nécessaires entre les divers aspects sociaux ne sauraient être, par leur nature, tellement simples et précises que les résultats observés n'aient pu jamais provenir que d'un mode unique de coordination mutuelle. Une telle disposition d'esprit, déjà évidemment trop étroite en biologie, serait surtout essentiellement contraire à la nature encore plus complexe des spéculations sociologiques. Mais il est clair que l'exacte appréciation générale de ces limites de variation, normales et même anormales, constitue nécessairement alors, au moins autant qu'en anatomie individuelle, un indispensable complément de chaque théorie de sociologie statique, sans lequel l'exploration indirecte dont il s'agit pourrait souvent devenir erronée.

N'écrivant point ici un traité spécial de philosophie politique, je n'y dois point méthodiquement établir la démonstration directe d'une telle solidarité fondamentale entre tous les aspects possibles de l'organisme social, sur laquelle d'ailleurs il n'existe guère maintenant, au moins en principe, de divergences capitales parmi les bons esprits. De quelque élément social que l'on veuille partir, chacun pourra aisément reconnaître, par un utile exercice scientifique, qu'il touche réellement toujours, d'une manière plus ou moins immédiate, à l'ensemble de tous les autres, même de ceux qui en paraissent d'abord le plus indépendans. La considération dynamique du développement intégral et continu de l'humanité civilisée permet, sans doute, d'opérer avec plus d'efficacité cette intéressante vérification du consensus social, en montrant avec évidence la réaction universelle, actuelle ou prochaine, de chaque modification spéciale. Mais cette indication pourra constamment être précédée, ou du moins suivie, par une confirmation purement statique; car, en politique, comme en mécanique, la communication des mouvemens prouve

spontanément l'existence des liaisons nécessaires. Sans descendre, par exemple, jusqu'à la solidarité trop intime des diverses branches de chaque science ou de chaque art, n'est-il pas évident que les différentes sciences sont entre elles, ou presque tous les arts entre eux, dans une telle connexité sociale, que l'état bien connu d'une seule partie quelconque, suffisamment caractérisée, permet de prévoir, à un certain degré, avec une vraie sécurité philosophique, l'état général correspondant de chacune des autres, d'après les lois d'harmonie convenables? Par une considération plus étendue, on conçoit également l'indispensable relation continue qui lie aussi le système des sciences à celui des arts, pourvu qu'on ait toujours soin de supposer, comme l'exige clairement la nature du sujet, une solidarité moins intense à mesure qu'elle devient plus indirecte. Il en est évidemment de même quand, au lieu d'envisager l'ensemble des phénomènes sociaux au sein d'une nation unique, on l'examine simultanément chez diverses nations contemporaines, dont la continuelle influence réciproque ne saurait être contestée, surtout dans les temps modernes, quoique le consensus doive être ici, d'ordinaire, moins prononcé, à tous égards, et décroître d'ailleurs graduellement avec l'affinité des cas et la multiplicité des contacts, au point de s'effacer quelquefois presque entièrement, comme, par exemple, entre l'Europe occidentale et l'Asie orientale, dont les divers états généraux de société paraissent jusqu'ici à peu près indépendans. (IV, 325–9)

832.n1 "Une propriété] [*paragraph*] Enfin, une quatrième et dernière propriété (I, 47)

832.n6 civilisées. . . . Tant] civilisées. [*ellipsis indicates 1-page omission*] Tant (I, 48–9)

——— *Synthèse subjective, ou Système universel des conceptions propres à l'état normal de l'humanité. Tome premier, contenant le Système de logique positive, ou Traité de philosophie mathématique*. Paris: Comte, Dalmont, 1856.

NOTE: in JSM's library, Somerville College. This work was only forecast at the time of JSM's first reference to it; the reference was deleted (in 1846) before the work appeared.

REFERRED TO: 615n–616n

CONDILLAC, ETIENNE BONNOT DE. Referred to: 29 (*976*), 175–6, 606; *1020*

——— *La Logique, ou les premiers developpemens de l'art de penser*. In *Oeuvres complètes*. 31 vols. Paris: Dufart, 1803, XXX, 131–51.

NOTE: this edition in JSM's library, Somerville College. The quotation is indirect.

QUOTED: 176 (*1061*) REFERRED TO: 134 (*1041*)

CONDORCET, MARIE JEAN ANTOINE NICOLAS CARITAT, MARQUIS DE. *Esquisse d'un tableau historique des progrès de l'esprit humain*. Paris: Agasse, 1795.

QUOTED: 832

832.3 l'expérience,] l'expérience du passé, (327)

832.6 histoire?] histoire. (327)

832.11 l'expérience . . . sont] l'expérience du passé, sur des objets du même ordre, sont (328)

——— *Vie de Monsieur Turgot*. London: n.p., 1786.

QUOTED: 18

18.1 "La scolastique, qui] La conservation de la Langue Latine & d'une partie des ouvrages des anciens; l'étude de la Scolastique, qui du moins préserva d'une stupidité absolue les Etats des barbares destructeurs de l'Empire Romain, & qui (8–9)
18.4 philosophie."] philosophie; l'établissement d'une Morale plus universelle, plus propre à rapprocher les hommes de tous les pays, fondée sur une fraternité générale entre tous les individus de l'espece humaine, tandis que la Morale payenne sembloit tendre à les isoler, à ne rapprocher que les membres d'une même cité, & sur-tout ne s'occupoit que de former des citoyens ou des philosophes, au lieu de former des hommes; la destruction de l'esclavage domestique & de celui de la Glebe, qui est peut-être autant l'ouvrage des maximes du Christianisme que de la Politique des Souverains, interessés à créer un peuple pour le faire servir à l'abaissement des Grands; cette patience, cette soumission que le Christianisme inspire, & qui, détruisant l'esprit inquiet & turbulent des peuples anciens, rendit les États Chrétiens moins sujets aux orages, apprit à respecter les Puissances établies, & à ne point sacrifier à l'amour, même légitime, de l'indépendance, la paix, le repos & la sûreté de ses freres: Tels furent les principaux bien-faits du Christianisme [according to Turgot's Latin Discourse of 1750]. (9–10)

CONFUCIUS. Referred to: 938

COPERNICUS. Referred to: 272, 776–7

COPLESTON. Referred to: 797

COURIER, PAUL LOUIS. Quoted: 693n

NOTE: quotation not located.

COUSIN, VICTOR. "Argument philosophique," *Gorgias*. In *Oeuvres de Platon*. Tr. Victor Cousin. 13 vols. Paris: Bossange, 1832–40, V, 129–80.

NOTE: the reference is specifically to 167–8.

REFERRED TO: 780; *1061*

——— *Cours d'histoire de la philosophie morale au dix-huitieme siècle. Seconde partie: Ecole écossaise*. Ed. Danton and Vacherot. Paris: Ladrange, 1840.

NOTE: the edition of 1841 (Brussels: Hauman) of Cousin's *Cours d'histoire* is bound with the three vols. of Cousin's *Cours de philosophie* (Brussels: Hauman, 1836) in JSM's library, Somerville College.

QUOTED: 60n–61n REFERRED TO: 60, 62n

61.n4 évidemment. . . . Je] [*ellipsis indicates ½ page omission;* "ici je" *follows on a question mark*] (230–1)

——— *Philosophie de Locke.* 4th ed. Paris: Didier, 1861.

NOTE: there is no indication of the ed. used by JSM.

QUOTED: 770

770.12–13 "Tout . . . cause."] Si à cette expérience trompeuse vous ajoutez le principe, que tout . . . cause, il vous faudra admettre dans la cause ce qui est dans l'effet, c'est-à-dire non-seulement de l'intelligence, de la sagesse et de la puissance, mais des imperfections dégradantes, comme a fait plus d'un peuple, sous la domination exclusive de l'expérience, et dans l'enfance de l'humanité. (395)

CRASSUS. Referred to: 941

NOTE: the reference is in a quotation from Stephen.

CROMWELL. Referred to: 778

CUVIER, GEORGES. Referred to: 119, 128 (*1035*), 523n

——— *Le Règne animal distribué d'après son organisation.* 4 vols. Paris: Deterville, 1817.

NOTE: the quotation at 139 is summary.

QUOTED: 139 (*1044*), 640

REFERRED TO: 656, 730

139.1–2 "Man . . . hands."] Première ordre des mammifères./Les bimanes ou l'homme. (I, 81)
640.11 que ceux] que de ceux (I, 11) [Source *as* 51, 56, 62, 65; *treated as typographical error*]
640.12 que ceux] que de ceux (I, 11) [Source *as* 51, 56, 62, 65; *treated as typographical error*]

D'ALEMBERT, JEAN LE ROND. Referred to: 800

——— "Doutes et questions sur le calcul des probabilités," in *Melanges de littérature, d'histoire, et de philosophie.* 4th ed. 5 vols. Amsterdam: Chatelain, 1767, V, 273–304.

NOTE: the ed. of 1759 (4 vols. Amsterdam: Chatelain), which does not contain this essay, is in JSM's library, Somerville College. The quotations are indirect; D'Alembert's example is based on tossing a coin, not throwing dice. (Bowen, in his *Lowell Lectures* [see above], translates a French note from Dugald Stewart's *Dissertation on the Progress of Metaphysical, Ethical, and Political Philosophy*, concerning an anecdote of Abbé Galiani citing the throwing of sixes with loaded dice; JSM must have known the passage, and may have unconsciously conflated the two. Curiously, though Bowen is citing the anecdote for its original purpose, i.e., to show that God has loaded Nature's dice, he goes on to cite JSM on chance.)

QUOTED: 632–4, 637

DALTON. Referred to: 221 (*1086*), 375, 473

DARWIN, CHARLES. *On the Origin of Species by Means of Natural Selection, or the preservation of favoured races in the struggle for life*. London: Murray, 1859.

NOTE: a copy of the 1861 ed. was formerly in JSM's library, Somerville College.

REFERRED TO: 498n–499n

DARWIN, ERASMUS. *Zoonomia; or, the Laws of Organic Life*. 3rd ed. 4 vols. London: Johnson, 1801.

NOTE: this edition (which was in JSM's possession) in the library of Somerville College, without the usual bookplate.

QUOTED: 769

769.24 metaphysics] metaphysic (I, 11) [*treated as typographical error in* 72]
769.27 a motion] or motion (I, 11)
769.28 sense."] sense; which will be explained at large in another part of the work. (I, 12)
769.32–770.1 "our . . . sense."] [*sub-section*] V. Another method of discovering that our . . . sense, is from considering the great analogy they bear to the motions of the larger muscles of the body. (I, 28; *variants of the quoted passage occur frequently in Section III*)

DAVY. Referred to: 265, 479, 775

NOTE: the reference at 775 is in a quotation from Coleridge.

DECANDOLLE. See Candolle.

DEMOCRITUS. Referred to: 786

DE MORGAN, AUGUSTUS. *The Differential and Integral Calculus*. London: Baldwin and Cradock, 1842.

NOTE: the reference is to De Morgan's "profound treatises" on algebra and calculus; see also his *Elements of Algebra*.

REFERRED TO: 615

——— *The Elements of Algebra Preliminary to the Differential Calculus*. London: Taylor, 1835.

NOTE: the reference is to De Morgan's "profound treatises" on algebra and calculus; see also his *Differential and Integral Calculus*.

REFERRED TO: 615

——— *Formal Logic: or, The Calculus of Inference, Necessary and Probable.* London: Taylor and Walton, 1847.

NOTE: in JSM's library, Somerville College, Oxford. The quotations at 592n and the second and third at 808n are indirect.

QUOTED: 143n, 171n, 173n, 207n, 239n, 592n, 808n; *1113* REFERRED TO: 170n, 171n–173n

171.n22 "numerically definite propositions,"] A numerically definite proposition is of this kind. (142)
171.n23–4 "45 Xs . . . 70 Ys," . . . "45 Xs . . . 70 Ys,"] Then an affirmative proposition of the sort in question is seen in '45 Xs . . . 70 Ys': and a negative proposition in '45 Xs . . . 70 Ys.' (142) [*4-sentence footnote omitted*]
173.n18 "numerically definite Syllogism,"] [*see collation at* 171.n22 *above*]
207.n5–6 Socrates . . . Socrates] Plato . . . Plato (259) [*cf. JSM's note to the passage*]
1113.19 [*see* 207 *above*]

DE MORGAN, GEORGE CAMPBELL.

NOTE: for the identification of De Morgan as the "mathematical friend," see *LL*, *CW*, XVI, 1084.

REFERRED TO: 599n–600n

DESCARTES, RENÉ. Referred to: 87, 222, 260 (*1097*), 263, 300n, 318, 364, 368, 368n, 490, 499, 752, 771–2, 813

NOTE: the reference at 364 is in a quotation from the reviewer of Tulloch's *Theism*; that at 368n is in a quotation from Fontenelle; that at 813 is an inaccurate version of the proof for the existence of God in Meditation III.

——— *Dissertatio de methodo.* Amsterdam: Elzevir, 1677.

NOTE: in JSM's library, Somerville College, bound together with *Meditationes.* Against the passage quoted JSM has pencilled "*non sequitur.*"

QUOTED: 751

751.25–7 "Credidi me," . . . "pro . . . esse;"] Et quia notabam, nihil plane contineri in his verbis, Ego cogito, ergo sum, quod me certum redderet eorum veritatis, nisi quod manifestissime viderem fieri non posse ut quis cogitet nisi existat, credidi, me pro . . . esse; et tantummodo difficultatem esse nonnullam, ad recte advertendum quidnam sit quod distincte percipimus. (21)

——— *Meditationes de prima philosophia.* Amsterdam: Elzevir, 1654.

NOTE: in JSM's library, Somerville College, bound together with *Principia Philosophiae.* See also the note above, under Descartes, referring to 813.

QUOTED: 771

771.13–15 "Si . . . nihilo;"] Hinc autem sequitur nec posse aliquid a nihilo fieri, nec etiam id quod magis perfectum est, hoc est, quod plus realitatis in se continet, ab eo quod minus: atque hoc non modo perspicue verum est de iis effectibus quorum

realitas est actualis sive formalis; sed etiam de ideis in quibus consideratur tantum realitas objectiva; hoc est non modo non potest, exempli causa, aliquis lapis qui prius non fuit, nunc incipere esse, nisi producatur ab aliqua re, in qua totum illud sit vel formaliter, vel eminenter quod ponitur in lapide; neo potest calor in subjectum quod prius non calebat induci, nisi a re quae sit ordinis saltem aeque perfecti atque est calor, & sic de caeteris; sed praeterea etiam non potest in me esse idea caloris, vel lapidis, nisi in me posita sit ab aliqua causa in qua tantundem ad minimum sit realitatis quantum esse in calore, vel lapide concipio: nam quamvis ista causa nihil de sua realitate actuali, sive formali in meam ideam transfundat, non ideo putandum est illam minus realem esse debere, sed talem esse naturam ipsius ideae, ut nullam aliam ex se realitatem formalem exigat praeter illam quam mutuatur a cogitatione mea cujus est modus; quod autem haec idea realitatem objectivam hanc vel illam contineat potius quam aliam, hoc profecto habere debet ab aliqua causa in qua tantumdem sit ad minimum realitatis formalis, quantum ipsa continet objectivae; si . . . nihilo; atqui quantumvis imperfectus sit iste essendi modus quo res est objective in intellectu per ideam, non tamen profecto plane nihil est, nec proinde a nihilo esse potest. (18–19)

DIGBY, KENELM. *A Late Discourse made in a solemne assembly of Nobles and Learned Men at Montpellier in France, touching the Cure of Wounds by the Powder of Sympathy; with instructions how to make the said powder; whereby many other secrets of nature are unfolded.* Tr. R. White. 2nd ed. London: Lowndes, and Davies, 1658.

NOTE: this is the ed. cited by Paris, from whom JSM takes the reference.

REFERRED TO: 779

DIOGENES. Referred to: cxiii

DIOGENES OF APOLLONIA. Referred to: 365

DOMITIAN. Referred to: 197 (*1073*)

ELDON. See Scott.

ELIZABETH I (OF ENGLAND). Referred to: 602–3, 892

ELLIS, THOMAS FLOWER. "Whewell's *Mechanical Euclid*—Principles of Mathematical Reasoning," *Edinburgh Review*, LXVII (April, 1838), 81–102.

NOTE: author identified in Walter E. Houghton, ed. *The Wellesley Index to Victorian Periodicals*, Vol. I (Toronto: University of Toronto Press, 1966), 485. There is no doubt that this is the article referred to (Whewell gives a precise reference), but JSM, in ascribing it to "a writer of great scientific eminence," may have been misled by an article in *Edinburgh Review*, LXVI (Oct., 1837), 110–51, "Whewell's *History of the Inductive Sciences*," by David Brewster, who had more "scientific eminence" than Ellis.

REFERRED TO: 228n

FONTENELLE, BERNARD LE BOVIER DE. "Eloge de Monsieur Leibnitz," in *Oeuvres*. New ed. 11 vols. Paris: Brunet, 1758–61, V, 492–57.

NOTE: this ed. gives the same page reference as that given by JSM to the Paris ed. of 1767, which was not available; the Paris ed. of 1766 (10 vols. Paris: Libraires Associés), which has different pagination, is in his library, Somerville College; in it the "Eloge" is in V, 447–506.

QUOTED: 368n

368.n1 "les] "Les (534)

FOTHERGILL. Referred to: 780

NOTE: the reference is in a quotation from Paris.

FOURCROY. Referred to: 793n

NOTE: the reference is in a quotation from Paris.

FREDERICK I (OF PRUSSIA). Referred to: 603

FRESNEL. Referred to: 502

GALL. Referred to: 498n, 860

GEMINUS. Referred to: 498

NOTE: the reference is in a quotation from Whewell.

GILBERT. Referred to: 498n

GLAUBER. Referred to: 428

NOTE: the reference is in a quotation from Herschel.

GOETHE, JOHANN WOLFGANG VON. *Versuch die Metamorphose der Pflanzen*. In *Werke*. Stuttgart: Cotta, 1828, III, 92ff.

NOTE: this ed. in JSM's library, Somerville College.

REFERRED TO: 523n

GRAHAM, GEORGE JOHN. Referred to: 816n

GRAHAM, THOMAS. "Liquid Diffusion applied to Analysis," *Philosophical Transactions of the Royal Society of London*, CLI (1861), 183–224.

NOTE: as JSM notes, reprinted in the *Journal of the Chemical Society of London*, XV (1862), 216–70. An offprint of the earlier version is in the University of London

Library; this is probably the "pamphlet" JSM refers to at 475n. The paper also appears in Graham's *Chemical and Physical Researches* (Edinburgh: Constable [for presentation only], 1876), 552–600. JSM gives 1862 rather than 1861 for its first publication (corrected in text above).

QUOTED: 475

REFERRED TO: 474–5

475.11–15 "while . . . insipid," . . . "are . . . membrane," . . . "it] [*paragraph*] While insipid. It may be questioned whether a colloid, when tasted, ever reaches the sentient extremities of the nerves of the palate, as the latter are . . . membrane, impermeable to soluble substances of the same physical constitution. [*paragraph*] It (220)

——— "Notice of the Singular Inflation of a Bladder." In his *Chemical and Physical Researches*. Edinburgh: Constable [for presentation only], 1876, 40–1.

NOTE: reprinted from *Quarterly Journal of Science*, II (1829), 88–9.

REFERRED TO: 478

GRANT, HORACE. *Arithmetic for Young Children*. London: Charles Knight, 1835.

NOTE: this book was reviewed by Mill in an unsigned article in *The Globe and Traveller* 23 October, 1835, p. 3.

REFERRED TO: 257n (*1095n*)

——— *Second Stage of Arithmetic*. New ed. London, 1861.

NOTE: the 1st ed. has not been located.

REFERRED TO: 257n

GROTE, GEORGE. *A History of Greece*. 12 vols. London: Murray, 1846–56.

NOTE: in JSM's library, Somerville College.

REFERRED TO: 942

GROTE, JOHN. *Exploratio Philosophica: Rough notes on modern intellectual science*. Part I. Cambridge: Deighton, Bell, 1865.

NOTE: in JSM's library, Somerville College. Part II, edited by Joseph B. Mayor, was published posthumously in 1900.

REFERRED TO: 63n

GROVE, WILLIAM ROBERT. *On the Correlation of Physical Forces: being the substance of a course of lectures delivered in the London Institution, 1843*. London: London Institution, 1846.

NOTE: the 3rd ed. (London: Longman, Brown, Green and Longman, 1855) is in JSM's library, Somerville College.

REFERRED TO: 333n; *1120n, 1121n, 1122n*

GUYTON-MORVEAU. Referred to: 704

HAIG, JAMES. *Philosophy; or, The Science of Truth. A Treatise on first principles, mental, physical, and verbal.* London: Saunders, Otley, 1861.

REFERRED TO: 34n–35n

HALL. Referred to: 389

HALLER. Referred to: 732n

HAMILTON, WILLIAM. Referred to: 63n, 206, 277–8

——— *Discussions on Philosophy and Literature, Education and University Reform, chiefly from the Edinburgh Review.* 2nd ed. London: Longman, Brown, Green and Longmans; Edinburgh: Maclachlan and Stewart, 1853.

NOTE: See also "On the Philosophy of the Unconditioned." "New Analytic of Logical Forms" is the running title of App. II (A), pp. 650–75, the title of which is "Of Syllogism, Its Kinds, Canons, Notations, Etc."; this is true also of the 1st ed., *ibid.*, 1852, where the Appendix is briefer (pp. 614–20). Hamilton's first publication of his prospectus for the "New Analytic" is in his ed. of Reid's *Works*, II, 1–4. In quoting from the version in *Discussions*, 2nd ed., JSM at 172–3 omits the 1st, 16th, 17th, and 18th of the "results" of the statement previously quoted, and omits the numbers (2nd to 15th) of those he quotes. The quotation at 251n is of Leslie's *Rudiments of Plane Geometry, q.v.* below.

QUOTED: 18n, 59, 59n–60n, 170n, 172–3, 251n, 276 REFERRED TO: 160n, 171n

18.n1 "To the] The exact distinction of *subject* and *object* was first made by the schoolmen; and to the (5n)

59.33 unknown.] unknown.* [*3-sentence footnote omitted*] (643–4)

59.n12 "It] Nor is this [that the philosopher is an ignorant admirer of the world of matter and mind] denied; for it (644)

60.n13 school."] school; and, as has so frequently been done, to attribute any merit, or any singularity to its recognition by any individual thinker, more especially in modern times, betrays only the ignorance of the encomiasts. (644)

172.17 "Logically] From the consistent application of this postulate [*To state explicitly what is thought implicitly*], on which Logic ever insists, but which Logicians have never fairly obeyed, it follows:—that, logically, (650)

276.31 "There] And as the *one* or the *other* of contradictions must be true, whilst both cannot; it proves, that there (624)

276.33 "Things] But practically, the *fact*, that we are free, is given to us in the consciousness of an uncompromising law of duty, in the consciousness of our moral accountability; and this fact of liberty cannot be redargued on the ground that it is incomprehensible, for the philosophy of the Conditioned proves, against the necessitarian, that things (624)

——— *Lectures on Metaphysics and Logic.* Ed. H. L. Mansel and J. Veitch. 4 vols. Edinburgh: Blackwood and Sons, 1859–60.

NOTE: the "New Analytic of Logical Forms" (pp. 249–317), referred to at 171n, is a collection of fragments; see also Hamilton, *Discussions*, above.

QUOTED: 15n, 355–6 REFERRED TO: 171n, 817

15.n4 "the . . . Thought"] This last condition [that a form of thought be a law], likewise, enables us to give the most explicit enunciation of the object-matter of Logic, in saying that Logic is the science of the Laws of Thought as Thought, or the . . . Thought, or the science of the Laws of the Form of Thought; for all these are merely various expressions of the same thing. (III, 25–6)

355.31 "is] [*paragraph*] This reasoning, in so far as regards the mere empirical fact of our consciousness of causality, in the relation of our will as moving and of our limbs as moved, is (II, 391)

——— "Note D: Distinction of the Primary and Secondary Qualities of Body," in *The Works of Thomas Reid*. Ed. William Hamilton. Edinburgh: Maclachlan and Stewart; London: Longman, Brown, Green and Longmans, 1846, 825–75.

NOTE: Hamilton is commenting on Whewell's "Demonstration that all Matter is Heavy," *Transactions of the Cambridge Philosophical Society*, VII.2; JSM takes his reference from Whewell's reply in his *Philosophy of Discovery*. See also Hamilton's *Discussions*, above.

QUOTED: 503n–504n

504.n1–2 "which," . . . "we can neither denude of their . . . nor clothe] Nay, more; there are, in fact, obtruded on our observation a series of apparent fluids, (as Light or its vehicle, the Calorific, Electro-galvanic and Magnetic agents,) which, in our present state of knowledge, we can neither, on the one hand, denude of the . . . nor, on the other, clothe (854n)

——— "On the Philosophy of the Unconditioned; in reference to Cousin's Infinito-Absolute." In *Discussions*, 1–38.

NOTE: a review of Cousin's *Cours*, reprinted from the *Edinburgh Review*, L (Oct., 1829), 194–221.

QUOTED: 734n REFERRED TO: 60n

HARTLEY, DAVID. Referred to: 14 (*967*), 57 (*993*), 787n, 854

——— *Observations on Man, his Frame, his Duty, and his Expectations*. 2 pts. London: Hitch and Austen, 1749.

NOTE: in JSM's library, Somerville College.

QUOTED: 560

560.16 "any] And as the false and imperfect Keys, which turn up to the Decypherer in his Researches, prepare the Way for the Discovery of the true and complete one, so any (I, 16)

560.16 which] that (I, 16) [*cf.* 560^{l-l}]

HEGEL. Referred to: 60n, 101n

HELVÉTIUS. Referred to: 866, *1020*

HERACLITUS. Referred to: 365

HERMOTIMUS. Referred to: 365

HERODOTUS. Tr. Henry Cary. London: Bohn, 1849.

NOTE: this ed. used for ease of reference. Two Greek and Latin eds. (Glasgow: Foulis, 1761; and Edinburgh: Laing, 1806) formerly in JSM's library, Somerville College.

REFERRED TO: 749

HERSCHEL, JOHN FREDERICK WILLIAM. Referred to: cxiv, 341, 498n

NOTE: for an elucidation of the reference at cxiv, see Textual Introduction, lxxx–lxxxi.

——— *Outlines of Astronomy*. London: Longman, Brown, Green, and Longmans; and Taylor, 1849.

NOTE: this is, in Herschel's words, an "extension" and "improvement" of his *Astronomy* (London: Longman, Rees, Orme, Brown, Green, and Longman; and Taylor, 1833), which appeared as no. 43 of Dionysius Lardner's Cabinet Cyclopaedia. The reference at 427n (added in 1865) is to the 7th "conclusion" of §570, which is not in the edition cited above, but is in the 5th ed. (London: Longman, Brown, Green, Longmans, and Roberts, 1858), 383–4.

QUOTED: 428 REFERRED TO: 427n

428.8 of residual phenomena] of what we have elsewhere termed RESIDUAL PHÆNOMENA*, [*footnote:*] *Discourse on the Study of Natural Philosophy. Cab. Cyclopædia, No. 14 (584)

428.9 kind. . . . It] kind, that is to say, of such portions of the numerical or quantitative results of observation as remain outstanding and unaccounted for after subducting and allowing for all that would result from the strict application of known principles. It (584)

——— *A Preliminary Discourse on the Study of Natural Philosophy*. London: Longman, Rees, Orme, Brown, and Green, 1831.

NOTE: Dionysius Lardner's Cabinet Cyclopaedia, No. 14.

QUOTED: 250n–251n, 406, 414–17, 420, 426–8, 484n REFERRED TO: 284n

406.4–5 subjects," . . . "have] subjects have (179)

414.10–12 "one . . . specimens" . . . "of . . . compass;"] [*section*] (168.) We have purposely selected this theory of dew, first developed by the late Dr. Wells, as one . . . specimens we can call to mind of . . . compass. (163)

414.15 "Suppose] [*section*] (163.) Let us now exemplify this inductive search for a cause by one general example: suppose (159)

414.16–17 place" . . . "We] place, we (159)

415.9–11 on." . . . "all] on: all (159)

415.12 point,] point (Rule 2. §147.), (159)

415.14 "Is] [*section*] (164.) But, in the case of the night dew, is this a *real cause*—is (160)
415.16 But . . . the] But the analogies are cogent and unanimous; and, therefore, (pursuant to Rule 3. §148.) we are not to discard their indications; and, besides, the (160)
415.27 must collect] must, therefore, collect (160) [*cf.* 415^{i-i}]
415.30 cases,] cases (Rule 4. §150.), (160)
415.30 produced:"] produced. (160)
416.1 dewed."] dewed; which last circumstance (by Rule 1. §146.) excludes [*as in* 416^{l}] (160)
416.20 obvious.] obvious (Rule 5. §152.). (161)
416.30 "But] [*no paragraph*] But (161)
416.31 with.] with (Rule 5. §152.) (161)
416.34–35 surface," . . . "and] surface (Rule 7. §156.), and (161)
417.2 copiously."] copiously: and thus we have detected another law of the same generality with the former, by a comparison of two classes of fact, one relating to dew, the other to the radiation of heat from surfaces. (161)
417.11 "Again] [*no paragraph*] Again (161)
417.15 velvet, wool] wool, velvet (161) [*cf.* 417^{n-n}]
417.16–22 dew." . . . "are] dew: and these are (161)
417.25 within;"] within. (162)
420.7 "It] [*section*] (166.) Lastly, among the negative instances, (§150.) it (162) [*this section follows immediately on the passage last quoted*]
420.10 increasing. . . . Dew] increasing. [*2-sentence omission*] This is so much the case, that dew (162)
420.11–12 overcast.] overcast (Rule 4. §150.). (162)
426.23 "It] [*no paragraph*] It (156)
426.28 "For] [*section*] (159.) For (156)
426.35 reappearance,] reappearances (156)
427.2–3 resistance. [*paragraph*] M. Arago] resistance. [*section*] (160.) This 9th observation is of such importance in science, that we shall exemplify it by another instance or two. M. Arago (157)
427.21 "Unexpected] [*section*] (181.) Unexpected (171)
427.32 in great] in a great (171) [*treated as typographical error*]
427.39 "Many] [*section*] (161.) Many (158)

——— "Quetelet on Probabilities," in *Essays from the Edinburgh and Quarterly Reviews, with Addresses and Other Pieces*. London: Longman, Brown, Green, Longmans, & Roberts, 1857, 365–465.

NOTE: reprinted from the *Edinburgh Review*, XCII (July, 1850), 1–57.

QUOTED: 203, 531

203.16–20 "a discovery," having been anticipated by Berkeley, to be "one . . . Logic." "When . . . winds,"] [*paragraph*] One . . . Logic—a step which may almost be termed a discovery when . . . winds—is that recently taken by Mr. Mill*, in showing that all reasoning (meaning thereby the investigation of truth as distinguished from the mere interpretation of a formula) is from particulars to particulars, and in thence assigning to general propositions their true character, and to the syllogism its true office. [*footnote:*] *System of Logic, 2nd ed. chap. iii., on the functions and logical value of the Syllogism. Perhaps Mr. Mill may be considered as only following out more emphatically the views originally taken by Berkeley on this subject, but which seem to have dropped so far out of notice as to give their revival all the force of novelty. (366–7)

531.n11 "that] The theory of Probabilities affords a ready and precise rule, applicable not only to this, but to far more intricate cases: it is this: that (395)
531.n13 individual aberrations," or deviations, "*shall*] individual errors or aberrations from exactness which the observations imply, shall (395)

——— "Whewell on the Inductive Sciences," in *Essays from the Edinburgh and Quarterly Reviews, with Addresses and Other Pieces.* London: Longman, Brown, Green, Longmans, & Roberts, 1857, 142–256.

NOTE: reprinted from the *Quarterly Review*, LXVIII (June, 1841), 177–238. The article is a review of Whewell's *History of the Inductive Sciences* (1837) and his *Philosophy of the Inductive Sciences* (1840). For ease of reference the version in *Essays*, which does not differ in the passages quoted, except at 249.44, *q.v.*, is cited in the collation.

QUOTED: 248n–250, 257n REFERRED TO: 344

248.n17 "The] And after all, the (198)
248.n18 axioms. . . . Let] axioms. The definitions we need not consider, but let (198)
248.n22 enunciation. . . . Those] enunciation. Of those which expressly relate to space, the axiom which declares magnitudes equal which exactly fill the same space, is clearly only a rule of interpretation declaring how the word equal is to be understood when space is the object of reference, and how the measurement of space is to be executed, and is only the ordinary practical process of measurement embodied in words. Those (199)
249.17 experience, . . . *including*] [*ellipsis indicates 5⅚-page omission*] (200, 206)
249.17–23 *including . . . relations*] [*not in italics, except for* "intuition" (23)] (206)
249.28 view. Let] view. As we conceive matter to have been created, and to admit of annihilation, we can of course conceive the non-existence of force, and if so, it certainly does appear a violent inroad on the liberty and power of thought to maintain that we may not, or cannot, conceive the laws of force to have been otherwise established than as we find them. But let (216)
249.44 exerted] excited (217) [exerted *in original version in QR*, 217]
249.50 its own half] [*in italics*] (217)
250.2 lever? The] lever? [*paragraph*] The (218)
250.4 weights . . . is] weights, is derived by Mr. Whewell, from the principle of reaction. [*9-sentence omission in which Whewell is refuted*] It is (218)
250.7 sustains it] sustains a body (219)
250.10 weights.' . . . But] weights. Certainly no person, with clear mechanical conceptions, ever wanted such a trial to convince him of its truth, or thought the truth clearer after the trial had been made." [*paragraph*] But (219)
250.17 "paradox . . . experience,"] [*cited by Herschel from Whewell*] (220)
250.19 truths expressible] truths (which we unconditionally admit) expressible (220)
250.26 locomotion. . . . There] [*ellipsis indicates 1-paragraph omission*] (220–1)
250.41 *imagination. . . . All*] imagination. If that sentiment be wanting, the picture is unfaithful: it is, in fact, no picture at all. It is, therefore, impracticable for us to frame any logically true and consistent proposition concerning such object, in which that sentiment is not at least implicitly involved, much less one in which it is explicitly contradicted. All (223)
250.42 if . . . axioms] if necessary axioms (223)
257.n9 "Number," . . . "we] Number, therefore, we (205)

HIPPASUS. Referred to: 365

HIPPO. Referred to: 359, 365

NOTE: at 365 JSM uses the French form, Hippon.

HOBBES, THOMAS. Referred to: 112n, 175 (*1061*), 827, 889

——— *Computatio sive logica*. In *Thomæ Hobbes Opera Philosophica quæ latine scripsit omnia*. Ed. William Molesworth. 5 vols. London: Bohn, 1839–54, I, 1–80.

NOTE: in JSM's library, Somerville College. See also "Computation or Logic," below.

QUOTED: 734

——— "Computation or Logic," Part I of *Elements of Philosophy: The First Section, Concerning Body*. In *The English Works of Thomas Hobbes*, I. Ed. William Molesworth. London: Bohn, 1839.

NOTE: in JSM's library, Somerville College. The references at 90–3 are all to iii, 2 (30–1). See also *Computatio sive logica* above.

QUOTED: 24, 95n, 96n, 96–7

REFERRED TO: 79, 90–3 (*1010–12*), 95 (*1013*), 99, 144 (*1046*), 176–7, 817; *1014, 1023n–1024n, 1028*

24.1–5 "A . . . mind."] [*section 4*] *A . . . mind.* (16)
24.5 had before] *had, or had not before* (16) [*cf. JSM's footnote to the passage*]
24.15 "But] [*section 5*] But (17)
95.n13 "From] [*paragraph*] From (36)
95.n16 these] those (36)
96.n1 "Men] [*section 1*] "Men (55)
96.n2 cogitation. . . . Tacit] [*ellipsis indicates 3-sentence omission*] (55–6)
96.n2 sense."] sense; and yet the deception proceeds neither from our senses, nor from the things we perceive; but from ourselves while we feign such things as are but mere images to be something more than images. (56)
96.22 "Abstract] For *concrete* is the name of any thing which we suppose to have a being, and is therefore called the *subject*, in Latin *suppositum*, and in Greek ὑποκείμενον; as *body, moveable, moved, figurate, a cubit high, hot, cold, like, equal, Appius, Lentulus*, and the like; and, *abstract* (31–2)
96.23 name. . . . And] [*ellipsis indicates 6½-sentence omission with concluding paragraph break*]
97.1 *accidents*."] *accidents*; I say accidents, not in that sense in which accident is opposed to necessary; but so, as being neither the things themselves, nor parts thereof, do nevertheless accompany the things in such manner, that (saving extension) they may all perish, and be destroyed, but can never be abstracted. (33)

——— *Leviathan, or the Matter, Form, and Power of a Commonwealth Ecclesiastical and Civil*. In *The English Works of Thomas Hobbes*, III. Ed. William Molesworth. London: Bohn, 1839.

NOTE: in JSM's library, Somerville College.

REFERRED TO: 827

——— "Physics, or the Phenomena of Nature," Part IV of *Elements of Philosophy: The First Section, Concerning Body*. In *The English Works of Thomas Hobbes*, I. Ed. William Molesworth. London: Bohn, 1839.

NOTE: in JSM's library, Somerville College. JSM's reference is vague, but the doctrine referred to is covered in the passage cited.

REFERRED TO: 101n

HOOKE, ROBERT. *Micrographia*. London, 1665.

NOTE: Mill, like most other philosophers (including Hume, and following Newton) attributes "*experimentum crucis*" to Bacon, whose term actually is "*instantia crucis*"; see Bacon's *Novum Organum*, 294.

QUOTED: 254 (*1093*)

HOOKER, RICHARD. *Of the Laws of Ecclesiastical Polity*. Book VIII, ed. Raymond Aaron Houk. New York: Columbia University Press, 1931.

NOTE: as no edition is cited, none is in JSM's library, and Book VIII is usually omitted in editions of Hooker, this modern ed. is cited for ease of reference.

QUOTED: 796

796.28 "As] [*section*] 1. First, as (280)
796.30 immovable] unmoveable (280)

HOOKER, WILLIAM JACKSON. *The British Flora; comprising the Phænogamous, or Flowering Plants, and the Ferns*. London: Longman, Rees, Orme, Brown, and Green, 1830.

NOTE: the quotation is in a quotation from Whewell's *History of Scientific Ideas*, where Whewell refers to this ed.

QUOTED: 701

701.8 spinuloso-serrate.'] spinuloso-serrate, involucres axillary solitary ovate inflated quite entire, rachis only slightly margined towards the extremity. (450)

HUME, DAVID. Referred to: 457, 769; *1119*

——— *An Inquiry Concerning Human Understanding*, in *Essays and Treatises on Several Subjects*. 2 vols. Edinburgh: Cadell, 1793, II.

NOTE: in JSM's library, Somerville College. Until 1758 entitled *Philosophical Essays Concerning Human Understanding*. Another copy of Hume's *Essays*, annotated by JSM, was bought from the Avignon bookseller, Romanille, in March, 1906, by the American novelist Thomas Nelson Page; its present location is unknown. The reference at 838 is to Section VII, "Of the Idea of Necessary Connection," II, 74–93; that at 852 is to Section II, "Of the Origin of Ideas," II, 30–5; the remainder are to Section X, "Of Miracles," II, 124–47.

REFERRED TO: 623, 625, 627, 630–1, 838, 852; *1151*

HUTTON, R. H. "Mill and Whewell on the Logic of Induction," *Prospective Review*, VI (Feb., 1850), 77–111.

NOTE: a review of the 2nd ed. (1849) of the *Logic*, and Whewell's *Of Induction; with especial reference to Mr. John Stuart Mill's System of Logic* (1849).

QUOTED: 331n–333n, 354, 359–60, 541, 541n–542n

REFERRED TO: 629n, 664n

331.n5 "we] But to take Mr. Mill on his own ground: even in external nature, we (104)

331.n9–13 "every . . . feel" . . . "allurement . . . surprise."] So, too, every . . . feel Mr. Mill's example, that "the cause of a surprise was the sentinel's being off his post," [*see* 330^{p-p} *above*] as incorrect; the allurement . . . surprise: but by common consent "cause" is always reserved for the active element, or the prominently active element, in producing an effect; and in matters of personal causation, mental or physical, where the consciousness of effort comes home, no one ever misapplies the term to the passive conditions; no one calls the *cause* [*see entry for* 332.n22–6 *below*] . . . necessary to . . . it (which . . . condition); there is quite enough consent amongst men in their employment of the term, to prove that it does denote a distinct element, the active element in the production of phenomena; and its misapplication in physical nature is easily accounted for by the impossibility of being able to perceive or understand the active element in processes quite external to our own consciousness. (105–6)

332.n22–6 "call the cause . . . necessary for . . . it, which . . . condition."] [*see entry for* 331.n9–13 *above*] (106)

333.32 "there] Such cases are unfair, and only complicate the question; that we do really reserve the word and the idea "cause" for active force, wherever that element can be detected and separated, is clear enough; the reason that in physical science this is so difficult to do, is, that *all* matter is probably resolvable into force, so that there is no phenomenon physically *caused* which is not the result of conflicting forces, and we can only select the one whose tendency is most obvious to produce the phenomenon; but there (105)

333.n34 arrested] corrected (105)

354.19 "It] To us, indeed, it (87)

354.20 creation. We] creation, as we (87)

354.22 mind."] mind: we know the kind of reply that Mr. Mill would make to such a notion; we know that he would say in his majestic, judicial way—"Inquiries of this kind have no relation to Logic; they belong to the science of transcendental Metaphysics; but I must renew my protest against adducing as proof of a fact in external nature, any necessity which the human mind may be conceived to be under, of believing in it." (87)

359.8 "Their] But their (108)

359.9 conviction.' . . . They] conviction. Accustomed to the inductions of mental science,—where no cause could even be suggested that did not contain something capable of deduction into a very *similar* effect, where the *probability* of a suggestion was seen even before it could be thrown out at all, and the mind knew before it began its search what *kind of cause* it must look for,—they looked out for the same kind of evidence for a physical cause before they even thought of trying it, and expected to find some evidence in a mental comparison, although neither the operation of the cause nor the nature of the effect were accessible to their consciousness: they (108–9)

359.10 only their] only to know their (109)

359.12 feel after] feel often (109)

359.14 mind. . . . They] mind, as the suggestion of mental causes for mental effects were [*sic*] accustomed to do. They (109)

360.10–12 "wanted . . . consequent," . . . "which . . . mind."] [*see* 359.13–15]
541.8 "what] To take then the simplest case first; what (100)
541.12 conditions] conditions* [*footnote:*] *We do not say "*causes*" for reasons we shall afterwards give. But if the word "cause" be used generally, to include all the conditions, it would not be incorrect. (100)
541.9 it. . . . After] [*ellipsis indicates the omission of 2⅚ sentences, with a footnote*] (101–2)
542.n4 future?"] [*⅚-page footnote, partly quoted at* 542n7, *here omitted*] (102)
542.n7 "would . . . erroneous," and "is] Besides this, Mr. Mill's method (see Vol. II. c. xviii, p. 78 [2nd ed.], of obtaining the chance, by comparing the cases in which the event occurs, and those in which it does not occur, and regarding the numbers so found as the ratio of the chances of success and failure, would . . . erroneous. It is (102n–103n)
542.n11 "would] This would (103n)

HUYGENS. Referred to: 799

IPHICRATES. Referred to: 941

JESUS. Referred to: 938

JOHNSON, SAMUEL. Referred to: 5n, 829 (see Boswell, *Life of Johnson*)

——— *The History of Rasselas, Prince of Abissinia*. In *The Works of Samuel Johnson*. London: Buckland, Rivington, *et al.*, 1787, XI, 1–144.

QUOTED: 26

26.29 "The] [*paragraph*] The (1)
26.30 princes,"] princes, was a spacious valley in the kingdom of Amhara, surrounded on every side by mountains, of which the summits overhang the middle part. (2)

JUSSIEU. Referred to: 732

KANT. Referred to: 14 (*967*), 59 (*994*), 60n, 116n, 830

KEPLER. Referred to: 292–8, 300n, 302, 303–4, 317, 342–3, 461, 490, 492, 494–5, 517, 647–8, 651–2, 798, 863, 872

NOTE: the reference at 300n is in a quotation from Whewell.

KNIGHT, RICHARD PAYNE. *An Analytical Inquiry into the Principles of Taste*. London: Payne, and White, 1805.

NOTE: JSM takes the reference from Stewart.

REFERRED TO: 676

KORAN. Referred to: 186

NOTE: the quotation at 368 has not been located. JSM's invariable spelling, Leibnitz, perhaps points to his use of French texts.

QUOTED: 368 REFERRED TO: 87, 95 (*1013*), 364, 367–9, 752, 758n, 771

——— *Esprit de Leibnitz, ou Recueil de pensées choisies, sur la religion, la morale, les langues, l'histoire, &c.* 2 vols. Lyons: Bruyset, 1772.

NOTE: this edition is the only Leibniz now in JSM's library, Somerville College; the volumes are (for JSM) heavily annotated on the back fly leaves, where, in Vol. II, there is the following reference to the passage here cited: "508 Motion only produced by motion".

REFERRED TO: 767

——— *Nouveaux essais sur l'entendement humain.* In *Oeuvres de Leibnitz.* New ed. 2 vols. Ed. A. Jacques. Paris: Charpentier, 1846.

NOTE: JSM's reference, which antedates this ed., is to the Paris ed. of 1842, which was not available; his reference is therefore left in the text, with the 1846 reference added.

QUOTED: 756

756.1 "Je] [*paragraph*] Sur tout cela je remarquerai, avant que de venir à l'explication de mon opinion, qu'il est sûr que la matière est aussi peu capable de produire machinalement du sentiment que de produire de la raison, comme notre auteur en demeure d'accord; qu'à la vérité je (I, 79)
756.3 ce que] ce qui (I, 79)
756.4 aussi . . . qu'enfin] aussi que les substances (matérielles ou immatérielles) ne sauraient être conçues dans leur essence nue sans activité; que l'activité est de l'essence de la substance en général, et qu'enfin (I, 79)

——— *Opera Omnia.* Ed. L. Dutens. 6 vols. Geneva: Fratres de Tournes, 1768.

REFERRED TO: 360

QUOTED: 239n

239.n11 "Tout] J'ai fait voir autrefois à Mr. *Bayle*, que tout (III, 446)

LEONIDAS. Referred to: 333n

LESLIE, JOHN. *The Philosophy of Arithmetic; exhibiting a progressive view of the theory and practice of calculation.* Edinburgh: Constable; London: Longman, Hurst, Rees, Orme, and Brown, 1817.

REFERRED TO: 257n (*1095n*)

——— *Rudiments of Plane Geometry, including Geometrical Analysis and Plane Trigonometry.* Edinburgh: Oliver and Boyd, 1828.

NOTE: JSM is following Hamilton's quotation from Leslie.

QUOTED: 251

LIEBIG, JUSTUS VON. Referred to: 479

——— *Animal Chemistry, or Organic Chemistry in its Applications to Physiology and Pathology*. Ed. William Gregory. London: Taylor and Walton, 1842.

NOTE: JSM probably used this ed., though a 2nd ed. appeared (*ibid.*), in 1843.

REFERRED TO: *1136–8*

——— *Organic Chemistry in its Applications to Agriculture and Physiology*. Ed. Lyon Playfair. London: Taylor and Walton, 1840.

NOTE: the wording of the quotation at 408 identifies this as the ed. used by JSM; revised 2nd (1842) and 3rd eds. (1843) were issued by Taylor and Walton, with "Organic" deleted from the title-page, and with "Application" substituted for "Applications" in the 2nd. The work corresponds to the lengthy "Introduction" in Vol. I of Liebig's *Traité de chimie organique* (3 vols. Ed. Charles Gerhardt. Paris: Fortin, Massin, 1841–44), which JSM may also have seen.

QUOTED: 408; *1132, 1133, 1134* REFERRED TO: 220, 407–10, 475–6; *1132–6, 1138–9*

408.23 "many] Many (338)
1132.23–5 "be . . . light."] Platinum, for example, does not decompose nitric acid; it may be . . . light (black spongy platinum). (220–1)
1133.3 "copper] [*paragraph*] Copper (221)
1133.23 "No] [*paragraph*] Now no (225) [*cf.* 1133[d–d]]

LINDLEY, JOHN. *An Introduction to the Natural System of Botany: or, A Systematic view of the organisation, natural affinities, and geographical distribution of the whole vegetable kingdom*. London: Longman, Rees, Orme, Brown, and Green, 1830.

NOTE: in JSM's library, Somerville College. The reference is in a quotation from Whewell.

REFERRED TO: 717

LINNÆUS. Referred to: 129 (*1037*), 700, 705, 713, 725, 732

NOTE: the reference at 700 is in a quotation from Decandolle; that at 725 is in a quotation from Whewell.

LOCKE, JOHN. Referred to: 14 (*967*), 29 (*976*), 57 (*993*), 59 (*994*), 87, 110 (*1017*), 112, 175 (*1061*), 305, 606, 649, 769, 770, 822–3; *1119*

——— *Essay Concerning Human Understanding*. In *Works*. New ed. 10 vols. London: Tegg, Sharpe, Offor, Robinson, and Evans, 1823, I–III.

NOTE: in JSM's library, Somerville College.

QUOTED: 640 REFERRED TO: 115 (*1019*)

LOUIS XIV (OF FRANCE). Referred to: 696n

LUCIAN. Referred to: 798

LUGO. Referred to: 753n

LUTHER. Referred to: 937

LYCURGUS. Referred to: 938

LYSICLES. Referred to: 941

MACAULAY, THOMAS BABINGTON. "John Dryden," *Miscellaneous Writings.* 2 vols. London: Longman, Green, Longman, and Roberts, 1860.

NOTE: in JSM's library, Somerville College. This ed. contains the first British reprint of Macaulay's three *Edinburgh Review* articles attacking James Mill's *Essay on Government.* The essay on Dryden is reprinted from the *Edinburgh Review*, XLVII (Jan., 1828), 1–36. Macaulay's authorship of the essay on Dryden was well known, and JSM may have seen the unauthorized American collection that preceded the first British collection; it appeared in Vol. I of *Critical and Miscellaneous Essays*, 2 vols. (Boston: Weeks, Jordan, 1840). Cary and Hart of Philadelphia reissued these with a third vol. in 1841; added a fourth in 1843, and a fifth (including the articles on James Mill's *Essay on Government*) in 1844.

QUOTED: 937

——— "Lord Bacon," *Edinburgh Review*, LXV (July, 1837), 1–104.

NOTE: reprinted in *Critical and Historical Essays.* 3 vols. London: Longman, Brown, Green, and Longmans, 1843, II, 280–429.

REFERRED TO: cxii

MACKINTOSH, SIR JAMES. *The History of England.* 10 vols. London: Longman, Rees, Orme, Brown, & Green, 1930–40.

NOTE: the exact quotation does not appear in this work, but the sense is given at I, 72 (and also in Mackintosh's "Speech on the Annexation of Genoa," in *Miscellaneous Works.* 3 vols. London: Longman, Brown, Green, & Longmans, 1854, III, 351–2). JSM probably took the reference from Samuel Bailey's *The Rationale of Political Representation* (London: Hunter, 1835, pp. 381–5, 428, Note F), where Mackintosh's use of this image is discussed, and both the above references are given. JSM reviewed Bailey's work in the *London Review*, I (July, 1835), 341–71.

QUOTED: 151–2 (*1049*)

MCCOSH, JAMES. *An Examination of Mr. J. S. Mill's Philosophy, being a Defence of Fundamental Truth.* London: Macmillan, 1866.

NOTE: the quotations at 577 and at 589n are indirect.

QUOTED: 577, 589n–590n

590.n9 "the] [*paragraph*] In another important group of sciences, those called the Classificatory by Dr. Whewell, the (325) [*McCosh appends a 7-sentence footnote to the end of this sentence; in the next sentence he comments that JSM* "has by no means completed the investigation" *of the logic of induction.*]

MACLEOD. Referred to: cxiv

MAGENDIE. Referred to: 452

NOTE: given by JSM as "Majendie" until the 6th ed.

MAHOMET. Referred to: 938

MALEBRANCHE, NICOLAS DE. *Recherche de la vérité.* Vol. II of *Oeuvres.* 2 vols. Ed. Jules Simon. Paris: Charpentier, 1842.

QUOTED: 368, 734 REFERRED TO: 771

368.18 "Quand] Mais quand (503)
368.21–3 avoir;" . . . "on] avoir. On (503)
368.26 soi-même:"] soi-même. (504)
734.5 "Il] [*paragraph*] Ceux qui ne doutent que de la première façon ne comprennent pas ce que c'est que douter avec esprit; ils se raillent de ce que M. Descartes apprend à douter dans la première de ses Méditations métaphysiques, parce qu'il (93)

MALTHUS. Referred to: 827

MANSFIELD. See Murray.

MARTINEAU, JAMES. "On the Life, Character, and Works of Dr. Priestley," *Monthly Repository*, n.s. VII (Jan., Feb., April, 1833), 19–30, 84–8 [4 pages misnumbered], 231–41.

NOTE: reprinted in *Miscellanies.* Boston: Crosby and Nichols; New York: Francis, 1852, 1–55. JSM follows the earlier version. In relation to JSM's theory of poetry, it should be noted that his "What is Poetry?" appeared in the number of the *Monthly Repository* that included the 1st instalment of Martineau's article.

QUOTED: 857–8 REFERRED TO: 481

857.25 [*paragraph*] "The] The (240)
858.6 discriminate] discriminative (240) [*cf.* 858^{i-i}]

MILL, JAMES. *Analysis of the Phenomena of the Human Mind.* 2 vols. London: Baldwin and Cradock, 1829.

NOTE: in JSM's library, Somerville College. See also 2nd ed., below.

QUOTED: 64

REFERRED TO: 40n–41n (*985*), 44n, 62n (*995*), 80 (*971*), 649, 852, 854

64.8 "thread of consciousness;"] [*see* Analysis I, 274, *where, in the same context, the phrase* "thread of my existence" *appears, and* II, 134, *where, in an extended discussion, the phrase* "thread of life" *appears*]

——— Ed. J. S. Mill. 2 vols. London: Longmans, Green, Reader, and Dyer, 1869.

NOTE: in JSM's library, Somerville College.

REFERRED TO: 664n, 853n

MILL, JOHN STUART. Referred to: 48n, 268n, 300n, 364

NOTE: these are references in quotations from others: Bain, Spencer, Whewell, and the reviewer of Tulloch.

——— "Bailey on Berkeley's Theory of Vision," *Dissertations and Discussions*, II. London: Parker and Son, 1859, 84–114.

NOTE: reprinted from *Westminster Review*, XXXVIII (Oct., 1842), 318–36. Appended to the *D&D* article, 114–19, is "Rejoinder to Mr. Bailey's Reply," reprinted from *ibid.*, XXXIX (May, 1843), 491–4.

REFERRED TO: 8n

——— "Coleridge," *Dissertations and Discussions*, I. London: Parker and Son, 1859, 393–466.

NOTE: reprinted from *London and Westminster Review*, XXXIII (March, 1840), 257–302. Reprinted in *Essays on Ethics, Religion and Society*, Vol. X of *Collected Works*. Toronto: University of Toronto Press, 1969, 117–63. For the collation, see the variant notes to the quoted passage (these also appear in Vol. X, App. D, 503–8).

QUOTED: 921–4

——— *Essays on Some Unsettled Questions of Political Economy*. London: Parker, 1844.

NOTE: in JSM's library, Somerville College. Reprinted in *Essays on Economics and Society, Collected Works*, IV. Toronto: University of Toronto Press, 1967, 231–339. Both of the quotations are from Essay V, "On the Definition of Political Economy," first published in the *London and Westminster Review*, IV and XXVI (Oct., 1836), 1–29, and so there is no anomaly in JSM's saying, in introducing the first quotation, that he is quoting "words used on a different occasion" when apparently citing a work published in 1844, after the *Logic* appeared. (As will be

noted, he added the reference to *Essays on Some Unsettled Questions* to the second quotation in the 2nd ed., 1846, but did not add the reference to the first quotation until the 3rd ed., 1851.) A comparison of the collation below and the variant footnotes with the variants between the 1836 and 1844 texts (see *Collected Works*, IV, 321–3) shows that JSM was either following the text as partially revised for the 1844 ed., or (less probably) revised the text of the article to follow that of the *Logic* (either possibility is supported, e.g., by 902^{g-g}). That there was a later revision, between the entering of the quotations on the *Logic* MS, and the publication of *Essays on Some Unsettled Questions*, is established, e.g., by 902^{h-h}, and *Coll. Works*, IV, 323^{z-z}. No precise dating is possible, but it is clear that JSM revised the essay sometime between its first publication in Oct., 1836, and the entry of the quotations in the press-copy MS of the *Logic* (final revision of Bk. III [first quotation] in 1841; of Bk. VI [second quotation] in 1842, with the concluding chapters —presumably including ix, in which the quotation occurs—again revised in 1843); one may assume, then, that he had publication in mind before Tait's suggestion in 1844 (*Earlier Letters*, XIII, 623–4), which led to a final revision (perhaps in proof) before Parker published the work.

QUOTED: 445–6, 901–3

445.31 impinges*] [*no footnote*] (162; *Coll. Works*, IV, 338)
901.35 "such] It [political economy] predicts only such (137; *Coll. Works*, IV, 321)
902.4 like our other] like other (138; *Coll. Works*, IV, 321, *cf.* 321^{v})
902.29 these] those (139; *Coll. Works*, IV, 322)
902.33 projectile] tangential (139; *Coll. Works*, IV, 322) [*cf.* 902^{g-g}, *and Coll. Works*, IV, 322^{w-w}]
903.5 has] is (140; *Coll. Works*, IV, 323, *cf.* 323^{z-z})

——— *An Examination of Sir William Hamilton's Philosophy and of the Principal Philosophical Questions Discussed in his Writings.* London: Longman, Green, Longman, Roberts and Green, 1865.

NOTE: in JSM's library, Somerville College. There were three subsequent editions (1865, 1867, 1872) in JSM's lifetime.

REFERRED TO: cxvi, 15n, 60n, 63n, 98n, 173n, 272n, 279n, 356n, 650n, 752n, 755n, 756n, 843n

——— "On Miss Martineau's Summary of Political Economy," *Monthly Repository*, n.s. VIII (April, 1834), 318–22.

NOTE: in *Essays on Economics and Society, Collected Works*, IV. Toronto: University of Toronto Press, 1967, 223–8.

QUOTED: 903–4

903.33 "shared] Thus, for instance, English political economists presuppose, in every one of their speculations, that the produce is shared (319; *Coll. Works*, IV, 225–6)
903.33 another, labourers] another—namely, labourers (319; *Coll. Works*, IV, 226)
903.34–5 and in fact] and fact (319; *Coll. Works*, IV, 226)
904.2 slave countries] the West Indies (319; *Coll. Works*, IV, 226)
904.3 the almost universal] the universal (319; *Coll. Works*, IV, 226) [*cf.* 904^{l-l}]
904.5 as frequently in] as in (319; *Coll. Works*, IV, 226) [*cf.* 904^{m-m}]
904.7–12 "that . . . live;"] To all of them [elaborate treatises on political economy], perhaps, it may be objected, that . . . live. (319; *Coll. Works*, IV, 225)

904.15 "it must not be] It must not, however, be (319; *Coll. Works*, IV, 226)
904.18 whoever] he who (319; *Coll. Works*, IV, 226) [*cf.* 904[o–o]]
904.19 others of the same kind,] others, (319; *Coll. Works*, IV, 226)
904.19 whoever] he who (319; *Coll. Works*, IV, 226) [*cf.* 904[p–p]]
904.21 have good sense] have sense (319; *Coll. Works*, IV, 226)

——— Review of George Cornewall Lewis's *Remarks on the Use and Abuse of some Political Terms*, *Examiner*, 22 April, 1832, 259–60.

NOTE: in the "Early Draft," JSM identifies the source of the quotation. JSM also reviewed Lewis's work in *Tait's Edinburgh Magazine*; see "Use and Abuse of Political Terms" below.

QUOTED: 153n–154n (*1050n*)

——— "Thoughts on Poetry and its Varieties," *Dissertations and Discussions*, I. London: Parker and Son, 1859, 63–94.

NOTE: a partial reprint of "What is Poetry?" *Monthly Repository*, n.s. 7 (Jan., 1833), 60–70, and "The Two Kinds of Poetry," *ibid.* (Oct., 1833), 714–24.

REFERRED TO: 481

——— "Use and Abuse of Political Terms," *Tait's Edinburgh Magazine*, I (May, 1832), 164–72.

NOTE: a review of G. C. Lewis's *Remarks on the Use and Abuse of some Political Terms*, also reviewed by JSM in the *Examiner*; see under Review above.

QUOTED: 818

818.3 *i.e.*]—viz. (169) [*cf.* 818[x–x]]
818.4 forbear doing] forbear from doing (169) [*cf.* 818[y]]
818.7 think worse] think the worse (169) [*cf.* 818[z]]
818.17 whole. [*paragraph*] The] whole. In this sense of the word, a man has no *right* to do that which is *wrong*, though it may often happen that nobody has a right to *prevent* him from doing it. [paragraph] The (169)
818.19 People] Men (169) [*cf.* 818[a–a]]
818.20 to good] to a good (169) [*cf.* 818[b]]
818.25 circumstances,"] circumstances, and is, perhaps, altogether the knottiest question in practical ethics. (169) [*cf.* 818[c–c]]

——— *Utilitarianism*. London: Parker, Son, and Bourn, 1863.

NOTE: reprinted from *Fraser's Magazine*, LXIV (Oct., Nov., Dec., 1861), 391–406, 525–34, 658–73. Three more eds. in JSM's lifetime; see the collated version in *Essays in Ethics, Religion and Society*, Vol. X of *Collected Works*. Toronto: University of Toronto Press, 1969, 203–59.

REFERRED TO: 855n, 951n

——— "Whately's *Elements of Logic*," *Westminster Review*, IX (Jan., 1828), 137–72.

NAPOLEON I (OF FRANCE). Referred to: 885, 944

NOTE: the reference at 885 is in a quotation from Coleridge.

National Review

NOTE: referred to simply as the "justly esteemed" successor to the *Prospective Review*.

REFERRED TO: 331n

NECKER. Referred to: 700

NOTE: the reference is in a quotation from Whewell.

NERO. Referred to: 197 (*1073*)

NEWTON, ISAAC. Referred to: 7n, 218 (*1085*), 239–40, 291, 317, 818, 937

——— "Letter III to Dr. Bentley." In *Opera quae exstant omnia*. Ed. Samuel Horsley. 5 vols. London: Nichols, 1779–85, IV, 437–41.

NOTE: the quotation (as JSM notes) is taken from Playfair's *Dissertation*, under which the collation is given; the references are to the same passage. This is the ed. cited by Playfair.

QUOTED: 754 REFERRED TO: 767

——— *Optics: or, a Treatise of the Reflections, Refractions, Inflections and Colours of Light*. In *Opera quae exstant omnia*. Ed. Samuel Horsley. 5 vols. London: Nichols, 1779–85, IV, 1–265.

NOTE: this ed. used for convenience of reference, it being used for the other references to Newton. The reference at 241 is in a quotation from Whewell.

REFERRED TO: 241, 502–3, 556n

——— *Philosophiæ Naturalis Principia Mathematica*. In *Opera quae exstant omnia*. Ed. Samuel Horsley. 5 vols. London: Nichols, 1779–85, II–III.

NOTE: this ed. used for convenience of reference, it being used for the other references to Newton. The so-called "Jesuit's Edition" (Geneva: Barrillot, 1739–42) is in JSM's library, Somerville College. Most of the references are generally to the law of gravity and related matters. The reference at 300n is in a quotation from Whewell.

QUOTED: 496 REFERRED TO: 220 (*1087*), 300n–301n, 483, 490, 492–5, 872; *1132*, *1134*, *1135–6*

496.13 "Hypotheses non fingo,"] Rationem verò harum Gravitatis proprietatum ex Phænomenis nondum potui deducere, & hypotheses non fingo. ("Scholium Generale," III, 174)

posterous hypothesis that has disgraced the annals of medicine, and bestowed medicinal reputation upon substances of no intrinsic worth, is that of the DOCTRINE OF SIGNATURES, as it has been called, which (43)

766.36 employed."] *employed!*† [*footnote:*] †This conceit did not escape the notice of the metaphysical poets of the seventeenth century; Cowley frequently availed himself of it to embellish his verse. (43)

767.15 pupil. The] pupil. [*paragraph*] The (45)

767.17 this very day] this day (45) [*cf.* 767[h–h]]

767.21 bile."] bile.* [*footnote:*] *For a further account of this conceit, see Crollius, in a work appended to his "BASILICA CHYMICA," entitled, "*De Signaturis internis rerum, seu de vera et viva Anatomia majoris et minoris mundi.*"

778.7 "is] It is a curious circumstance, that the same superstitious belief [as that recorded by Pliny and others] should exist among the Negroes of the West Indies, who affirm that the colour of Coral is (21n)

779.9 a day.] a-day.† [*Paris's footnote cites poetic uses of the belief by Scott in* The Lay of the Last Minstrel (*III, xxiii*) *and Dryden in* The Enchanted Island (*V, ii and iv*).] (22n–23n)

779.15 on] upon (23) [upon *in* MS, 43, 46, 51, 56, 62; upon *unchanged in the next line in all versions*]

779.20 "In] The wonderful cures of Valentine Greatracks, performed in 1666, which were witnessed by cotemporary prelates, members of parliament, and fellows of the royal society, amongst whom was the celebrated Mr. Boyle, would probably upon investigation admit of a similar explanation [to that of the cases by Digby]; it deserves, however, to be noticed, that in (28)

779.35 "The] Thus, the (62)

780.2 exercise."] exercise.* [*footnote:*] *Wesley's Journal, vol. xxix. 290–293. (62n)

792.33–4 "lentor . . . blood,"] [*paragraph*] THE MECHANICAL THEORY, which recognised "*lentor . . . blood,*" as the principal cause of all diseases, introduced attenuant and diluent medicines, or substances endued with some mechanical force; thus Fourcroy (38) [*the quotation is resumed at* 793.n1]

793.n1 "Thus Fourcroy] [*see entry for* 792.33–4 *above*] (38)

793.n2 gravity,] gravity,* [*footnote:*] *Van Swieten, in his Commentaries on the Venereal disease, has an aphorism founded on the same hypothesis, "*Render the blood and lymph more fluid, and you will have destroyed the virus.*" Sect. 1477. (39n)

793.2–5 "acknowledged . . . parts," . . . "all] [*paragraph*] THE CHEMISTS, as they acknowledged . . . parts, so they conceived all (39)

793.9 received] receive (40) [*cf.* 793[j–j]]

793.17 alone [only] be] alone be (40) [*cf.* 793[k–k]]

793.18 medicines."] medicines; an extravangance into which Van Helmont, himself, would hardly have been betrayed:—but thus it is in Philosophy, as in Politics, that the partisans of a popular leader are always more sanguine, and less judicious, than their master; they are not only ready to delude the world, but most anxious to deceive themselves, and while they warmly defend their favourite system from the attacks of those that may assail it, they willingly close their own eyes, and conceal from themselves the different points that are untenable; or, to borrow the figurative language of a French writer, they are like the pious children of Noah, who went backwards, that they might not see the nakedness which they approached for the purpose of covering. (40)

793.n15–20 "generalized . . . excitement;" . . . "that . . . class."] As he generalized . . . excitement, so did he abridge our remedies, maintaining, that . . . class: the mischievous tendency of such a doctrine is too obvious to require a comment. (43)

PARKES. Referred to: 449n

NOTE: the reference is in a quotation from Bain.

——— *Republic*. In *The Dialogues of Plato*. Tr. Benjamin Jowett. 4 vols. Oxford: Clarendon Press, 1871, II.

NOTE: this ed., which is in JSM's library, Somerville College, is used for ease of reference.

REFERRED TO: 150 (*1048*)

——— *Sophist* (*Sophistes*). In *The Dialogues of Plato*. Tr. Benjamin Jowett. 4 vols. Oxford: Clarendon Press, 1871, III.

NOTE: this ed., which is in JSM's library, Somerville College, is used for ease of reference.

REFERRED TO: 825

PLAYFAIR, JOHN. *Dissertation Second: Exhibiting a General View of the Progress of Mathematical and Physical Science, since the Revival of Letters in Europe*. Part I, in *Supplement to the Fourth, Fifth, and Sixth Editions of the Encyclopædia Britannica*, II. Edinburgh: Constable; London: Hurst, Robinson, 1824, 1–127. Part II, *ibid*., IV, 1–90.

NOTE: Dugald Stewart's *Dissertation First: Exhibiting a General View of the Progress of Metaphysical, Ethical, and Political Philosophy, since the Revival of Letters in Europe* appears in *ibid*., I and V. The quotation at 754 is of Playfair's quotation from Newton's "Letter III to Dr. Bentley", *q.v.*; the collation is given here, as JSM is quoting Playfair's version.

QUOTED: 754, 760, 777, 816

754.5 *contact* . . . . that] contact; as it must do, if gravitation, in the sense of Epicurus, be essential or inherent in it. That (Playfair, IV, 83n; Newton, IV, 438: Newton *reads* "and inherent")
754.9 who in philosophical matters has] [JSM *agrees with* Playfair; Newton *reads* "who has in philosophical matters" (IV, 438)
760.3 "borrows] Great ingenuity is displayed in this demonstration; and it is remarkable, that the author [Archimedes] borrows (II, 27)
777.5 "The] It was admitted that it [the ball] must fall behind it [the mast] because the (II, 85)
777.6 ship—and the] ship, and that the (II, 85)
777.8 annular] annual (II, 85) [*cf*. 777^{j-j}]
816.26 simply:"] simply; and, according to which of these ways the force itself is to be measured, may involve the propriety or impropriety of mathematical language, but cannot be changed with absurdity or contradiction. (VI, 37)

——— *Elements of Geometry; containing the first six books of Euclid*. 9th ed. Edinburgh: Bell and Bradfute, and Stirling, Kenney; London: Longman, Rees, Orme, Brown, Green and Longman, 1836.

NOTE: in this ed. Playfair introduces "at the end of the Axioms, some other general propositions, which were formerly tacitly assumed, in one or other of the demonstrations . . ." (v). JSM's citations to Euclid are given here for ease of reference.

QUOTED: 230 REFERRED TO: 145 (*1046–7*), 160 (*1054*), 161 (*1055*), 166 (*1057*), 191

230.4–5 intersect each other cannot both of them be parallel to a third straight] intersect one another, cannot be both parallel to the same straight (22)

PLINY. *Natural History*. Ed. H. Rackham. 10 vols. London: Heinemann; Cambridge, Mass.: Harvard University Press, 1938–42.

NOTE: this ed. used for ease of reference. Both refs. are to II, 520 (Bk. VII, Chap. ii).

PLUTARCH. *Septem Sapientium Convivium*. In *Moralia* (Greek and English), II. Ed. Frank Cole Babbitt. London: Heinemann; New York: Putnam's Sons, 1928, 345–448.

NOTE: this ed. used for ease of reference. The quotation is of an imaginary speech of Thales; it occurs in a quotation from Whewell.

POPE, ALEXANDER. *The Dunciad*. In *Works*. New ed. Ed. Joseph Warton, *et al.* 9 vols. and Supplementary Vol. London: Priestley, 1822 (Supplementary Vol. London: Hearne, 1825), V.

NOTE: this ed. in JSM's library, Somerville College.

——— *Essay on Man*. In *Works*, III.

834.13 "the proper study of mankind"] Know then thyself, presume not God to scan,/The proper study of Mankind is Man." (III, 53; Epistle II, ll. 1–2.)

——— *Moral Essays*. In *Works*. New ed. Ed. Joseph Warton, *et al.* 9 vols and Supplementary Vol. London: Priestley, 1822 (Supplementary Vol. London: Hearne, 1825), III.

NOTE: this ed. in JSM's library, Somerville College.

456.16–17 —following life, in creatures we dissect,/We lose it, in the moment we detect.] Like following life through creatures you dissect,/You lose it in the moment you detect. (III, 178; Epistle I, ll. 29–30)

PORPHYRY. *Isagoge*. In Aristotle. *Organon* (Greek and Latin). Ed. Julio Pacius. 3rd ed. 3 vols. Geneva: Vignonianis, 1605, I.

NOTE: Vols. I and III of this ed. in JSM's library, Somerville; the quotation (Chap. iii, 5) is at I, 14.

Port Royal Logic. See Arnauld.

POWELL, BADEN. *Essays on the Spirit of the Inductive Philosophy, The Unity of Worlds, and The Philosophy of Creation*. London: Longman, Brown, Green, and Longmans, 1855.

NOTE: JSM's reference at 333n antedates this work, but as he merely takes the reference at second hand, and Powell is repeating his former argument, this reference is given.

QUOTED: 566n–567n REFERRED TO: 333n, 367n

566.n4 "conviction . . . nature,"] [*paragraph*] The system of inductive reasoning in its full extent essentially involves the *conviction . . . nature*. (98)
566.n6 "We] And we (98)
566.n14 observation. And] observation. [*paragraph*] And (99)
566.n19 especially] expressly (99)

PRELLER, LUDWIG, and AUGUST HEINRICH RITTER. *Historia Philosophiae Graeco-Romanae ex Fontium Locis Contexta*. Hamburg: Perthes, 1838.

NOTE: it is likely that George Grote supplied JSM with this reference. In his copy of Preller and Ritter (University of London Library), Grote has marked the passage on 10 with his characteristic "X/X". (*Cf.* note to Brandis, *Handbuch*, above.)

QUOTED: 364

364.28 "quibus] Et simile quid Ciceroni obversatum esse dixeris quum scriberet haec, *Thales—aquam dixit rerum inituim, deum autem eam mentem, quae ex aqua cuncta fingeret*, v. Nat. D. I, 10; quibus (10)

PRIESTLEY, JOSEPH. Referred to: 481

NOTE: the reference is to Martineau's article on Priestley.

——— *An Examination of Dr. Reid's Inquiry into the Human Mind on the Principles of Common Sense, Dr. Beattie's Essay on the Nature and Immutability of Truth, and Dr. Oswald's Appeal to Common Sense in Behalf of Religion*. 2nd ed. London: Johnson, 1775.

NOTE: in JSM's library, Somerville College. The quotation is indirect.

QUOTED: 577

577.23–4 though we have had no . . . we have had abundant experience] though no man has had any . . . every man has had experience (85–6)

——— *Hartley's Theory of the Human Mind, on the Principle of the Association of Ideas; with Essays relating to the subject of it*. London: Johnson, 1775.

REFERRED TO: 560n

QUOTED: 357–8 REFERRED TO: 353n

357.17 "when] Chap. III/Causes of the Ambiguity of Those Words [Cause and Effect, Action, and Active Power]./When (605)
357.19 and that there are] and that they have (605)
357.24 have 'Savages] have. [*paragraph*] "Savages (605)
357.26 soul.' All] soul." [*paragraph*] All (605)
357.28–9 do." [*paragraph*] The] do. [*paragraph omitted*] However this may be, the (605) [*in* 51, 56 *the reading is* do."; *in* 62, 65, 68, 72 *the quotation marks are omitted; treated as typographical error in the text*]
358.13 further] farther (605)

——— *Essays on the Intellectual Powers of Man.* In *The Works of Thomas Reid.* Ed. William Hamilton. Edinburgh: Maclachlan and Stewart; London: Longman, Brown, Green, and Longmans, 1846, 213–508.

REFERRED TO: 338, 768–9

RITTER, HEINRICH. *Geschichte der Philosophie alter Zeit.* 3 vols. 2nd ed. Hamburg: Perthes, 1836.

NOTE: though there are no marks in George Grote's copy of the 2nd ed. of Ritter (University of London Library), it is likely that he supplied JSM with this reference; see the notes to Brandis, *Handbuch*, and Preller and Ritter, *Historia*, above.

QUOTED: 364

364.22 "Schiefe Ansicht, durchaus zu verwerfen;"] Aus solchen Ausdrücken mochte Cicero die schiefe Ansicht von der Lehre des Thales fassen, welche er *de nat. D.* I. 10 mittheilt; sie ist durchaus zu verwerfen, denn sonst würden die Alten gesagt haben, Thales habe nicht das Wasser allein, sondern das Wasser und Gott für Urwesen gehalten. (211n)

ROUSSEAU. Referred to: 827, 866

ST. AUGUSTINE. *De Civitate Dei libri XXII.* 2 vols. Leipzig: Tauchnitz, 1825.

NOTE: as no ed. is cited, and none is in JSM's library, this ed. is given merely for comparison.

QUOTED: 364

364.35 "non tamen ab ipsis [Diis] aërum] Iste Anaximenem discipulum et successorem reliquit: qui omnes rerum causas infito aëri dedit: nec deos negavit, aut tacuit: non tamen ab ipsis aërem (I, 225; Lib. VIII, cap. ii)

ST. PAUL. Referred to: 938

SAINT HILAIRE. Referred to 523n

SALMASIUS. Referred to: 749

SOCRATES. Referred to: 938

SPENCER, HERBERT. Referred to: cxv

——— Letter to JSM, 11 October, 1865. In David Duncan. *The Life and Letters of Herbert Spencer*. London: Methuen, 1908, 121.

REFERRED TO: 270n

——— "Mill *versus* Hamilton—The Test of Truth," *Fortnightly Review*, I (15 July, 1865), 531–50.

NOTE: the final paragraph (along with other parts of this article) was reprinted by Spencer in his *Principles of Psychology*, 2nd ed., II, 406n–407n, and is quoted thence by JSM at 272 (see below under *Principles of Psychology*).

QUOTED: 269, 272, 278–9

269.34 "one] An inconceivable proposition is one (534–5)
278.34 "When] [*no paragraph*] When (533)

——— *The Principles of Psychology*. London: Longman, Brown, Green, and Longmans, 1855.

NOTE: The substance of chap. iii, "The Universal Postulate," from which JSM quotes, first appeared in the *Westminster Review*, n.s. IV (Oct., 1853), 513–50; JSM took up the criticisms in the 4th ed. (1856) of the *Logic*; Spencer returned to the subject in his "Mill *versus* Hamilton" (1865; see above); JSM made revisions in the 7th ed. (1868) as a result; Spencer again referred to the matter in the 2nd ed. of his *Principles* (Vol. II, 1872; see below), to which JSM adverted in his 8th ed. (1872).

QUOTED: 262–4, 266–7, 267n, 270 REFERRED TO: 62n, 178n–180n, 269, 371–2

262.12–13 "simply our . . . experience." . . . "widely] But whilst agreeing with him [J. S. Mill] in the belief that axioms are simply "our . . . experience," it is possible to differ from him widely
262.16 "invariably exists."] [*the phrase is used in several places by Spencer*, e.g., 26, 29]
262.21–3 "The . . . not."] For when, to the fact that the invariable existence of a belief is the deepest warrant we can have for it, we add the further fact that we consider those beliefs true of which the negations are inconceivable, it becomes at once obvious that *the . . . not.* (26)
262.23 "For] [*paragraph*] It results then, that for (27)
262.24 cause their] cause (27)
263.2 "while] whilst (28)
263.26–7 "men . . . inconceivable."] For the facts cited simply go to show that men . . . inconceivable—a species of error which, if it vitiates the test of inconceivableness, must simply vitiate all tests whatever. (20)
263.30 "the . . . inconceivableness,"] [*see* 262.12–13 *above*]
263.31 "must] For the facts cited simply go to show that men have mistaken for inconceivable things, some things which were not inconceivable—a species of error which, if it vitiates the test of inconceivableness, must (20)

263.34 on no other ground] "on no other ground" (20) [*Spencer is quoting JSM; see* 242.29 *above*]
263.41 it . . . . Though] it. [*paragraph*] Conceding the entire truth of Mr. Mill's position, that, during any phase of human progress, the ability or inability to form a specific conception wholly depends on the experiences men have had; and that, by a widening of their experiences, they may, by and by, be enabled to conceive things before inconceivable to them; it may still be argued that as, at any time, the best warrant men can have for a belief is the perfect agreement of all pre-existing experience in support of it, it follows that, at any time, the inconceivableness of its negation is the deepest test any belief admits of. Though (21)
264.7–8 "a . . . true,"] Mean what we may by the word truth, we have no choice but to hold that *a . . . true.* (31)
264.12–19 "Conceding . . . of] [*see entry for* 263.41 *above*] (21)
264.19–20 of . . . . Objective] of. [*1-page omission*] Well, objective (21–2)
264.31 be . . . certain] be, as Mr. Mill holds, certain (22)
264.33 if . . . these] if, as he shows, these (22)
266.23 "is] [*paragraph*] Not only, however, is the invariable existence of a belief our sole warrant for every truth of immediate consciousness, and for every primary generalization of the truths of immediate consciousness—every axiom; but it is (28)
266.33 "when] [*paragraph*] Dismissing, however, all psychological explanations, which are allowable here only as being needed to meet a psychological objection, and returning to the purely abstract view of the matter, we see—first, that belief is fundamental, and that the invariable existence of a belief is our highest warrant for it; second, that we can ascertain the invariable existence of a belief only as we ascertain the invariable existence of anything else, by observing whether under any circumstances it is absent from the place in which it occurs; third, that the effort to conceive the negation of a belief is the looking in the place in which it occurs (viz., after its antecedents), and observing whether there are any occasions on which it is absent, or can be made absent; and fourth, that when we fail to find such occasions—when (30–1)
266.36 it . . . . We] [*the ellipsis is of the sentence given above at* 264.7–8] (31)
267.6 "beliefs] Beliefs (31)
267.7–8 untrue," and as "beliefs] untrue. And as beliefs (31)
267.9 fate;"] fate, the test is clearly not an infallible one (31)
267.9–10 "the . . . conclusion" is that "which . . . times."] Not only as judged instinctively, but as judged by a fundamental logic, that must be *the . . . conclusion which . . . times.* (33)
367.n1–2 "necessity"] [*see Spencer,* 24–5, *and Textual Introduction,* xci *above*]
370.15 "an . . . non-existence"] [*see entries for* 262.23 & 24 *above*]
371.1 conceive,"] conceive. (19)

——— *The Principles of Psychology.* 2nd ed. 2 vols. London: Williams and Norgate, 1870, 1872.

NOTE: the passages quoted from II, 406n–407n appear also in Spencer's "Mill *versus* Hamilton," 550.

QUOTED: 268n, 269n, 273–4, 275, 275n

268.n4 "Were] [*no paragraph*] Were (II, 433)
269.n1–2 "test . . . conclusions"] [*section 437*] Do we not here then discern a rigorous test . . . conclusions? (II, 435)
273.4–5 "amicable controversy that has been . . . us;"] The amicable controversy that has thus been . . . us, I am now obliged to resume. (II, 406n)

273.5 "this] In the second place, this (II, 407n) [*for the first reason, see the next entry*]

273.10 "superficial . . . substantial;"] In the first place, the difference is, I believe, superficial . . . substantial; for it is in the interests of the Experience-Hypothesis that Mr. Mill opposes the alleged criterion of truth; while it is as harmonizing with the Experience-Hypothesis, and reconciling it with all the facts, that I defend this criterion. (II, 407n)

273.14 "profound . . . considered;"] Mr. Mill, however, whose unswerving allegiance to truth is on all occasions so conspicuously displayed, will recognize the justification for this utterance of disagreement on a matter of such profound . . . considered; and will not require any apology for the freedom with which I have criticized his views while seeking to substantiate my own. (II, 407n)

273.19–20 "cognitions . . . subjects."] [*see next quotation*] (II, 425)

273.20 "an] [*paragraph*] An (II, 425)

274.4–5 not," . . . "disprove] not, does not disprove (II, 425)

274.5–9 test;" . . . "is . . . it," . . . "were . . . decomposable."] test, for these reasons: —(1) that they were . . . decomposable; (2) that this test, in common with any test, is . . . it; (3) that if it were needful to abandon the test because an absolute guarantee against the misuse of it cannot be found, still more needful would it be to abandon logical principles, the misapplications of which are immeasurably more numerous; but that (4) as applied only to the undecomposable propositions which embody the ultimate relations of number, space and time, the test when used with due care has ever yielded, and continues to yield, uniform results. (II, 425–6) [*I.e., JSM reverses the first and second reasons, and omits the third and fourth.*]

274.9 "A] It was shown by implication that a (II, 410)

274.13 relations . . . . But] relations, and can be known in no other way: the proposition is one of which the negation is inconceivable, and is rightly asserted on that warrant. But (II, 411–12)

274.17 relations."] relations: each of which judgments is essentially of the same kind as that by which the above axiom is known, and has the same warrant. (II, 412)

274.23 "distinctly] And what occasionally happens in calculation, frequently happens in more complex thinking: men do not distinctly (II, 413)

275.n2 "cannot be . . . undergone"] I do not quote them [*further instances cited by JSM in this context*], however, because they cannot, I think, be . . . undergone the change he alleges. (II, 409n)

275.n4 "If an] If, however, an (II, 409n)

275.16–19 "before . . . sides," I have "to . . . case."] Suppose, before . . . sides, I had to . . . case; the time required for the rehearsal of all these memories would be so great that the proposition affirmed to-day could not be verified before to-morrow. (II, 417)

SPENSER, EDMUND. *Faerie Queene.*

NOTE: the reference is simply to Una.

REFERRED TO: 852

SPINOZA, BENEDICT DE. Referred to: 752

——— *Ethica.* In Vol. I of *Opera.* Ed. C. H. Bruder. 3 vols. Leipzig: Tauchnitz, 1843.

NOTE: as no edition is cited, and there is none in JSM's library, Somerville College, this one is cited merely for comparison.

QUOTED: 770

770.27 potest,"] potest. (189)

STEPHEN, JAMES FITZJAMES. "The Study of History," *Cornhill Magazine*, III (June, 1861), 666–80; IV (July, 1861), 25–41.

QUOTED: 941

941.23 "produce] [*paragraph*] It would thus appear that upon the question whether individuals produce (IV, 38)
941.24 death . . . . No] death, those who disbelieve in the possibility of a science of history are right; but to infer from this that there never can be a science of history are altogether wrong. [*ellipsis indicates a jump backward to the previous page; the end of the passage quoted after the ellipsis comes immediately before the passage quoted before the ellipsis*] No (IV, 38, 37)
941.24 doubt that] doubt for a moment that (IV, 37)

STEWART, DUGALD. Referred to 263, 287n, 306, 560, 577, 649n, 830; *1091, 1101, 1119*

——— *Elements of the Philosophy of the Human Mind*. 3 vols. Vol. I, London: Strachan and Cadell; Edinburgh: Creech, 1792. Vol. II, Edinburgh: Constable; London: Cadell and Davies, 1814. Vol. III, London: Murray, 1827.

QUOTED: 282, 640n, 783 REFERRED TO: 190–2 (*1069–70*), 226–9

783.22 "The] So deeply rooted in the constitution of the mind is that disposition on which philosophy is grafted, that the (443)
783.26 statements. A] statements. [*paragraph*] A (443)

——— *Philosophical Essays*. Edinburgh: Creech, and Constable, 1810.

QUOTED: 675–8 REFERRED TO: 152 (*1049*)

675.32 "that] [*paragraph*] I shall begin with supposing, that (217)
677.1 "But] [*section*] 2. But (226)
677.2 or the] or of the (226)
677.12 race . . . . According] race; and an attempt to investigate by what particular process this uniform result has been brought about, on so great a variety of occasions, while it has no tendency to involve us in the unintelligible abstractions of the schools, can scarcely fail to throw some new lights on the history of the human mind. [*paragraph*] I shall only add, at present, upon this preliminary topic, that, according (226–7)
677.13 and strength] and of strength (227)
677.19 in] into [*cf.* 677^{f-f}]
677.36–678.5 "a . . . applied:"] [*paragraph*] The speculations which have given occasion to these remarks have evidently originated in a . . . applied. (214)
678.13 "causation] [*paragraph*] Of this principle [*see previous quotation*], which has been an abundant source of obscurity and mystery in the different sciences, it would be easy to expose the unsoundness and futility; but, on the present occasion, I shall only remind my readers of the absurdities into which it led the Aristotelians on the subject of *causation* (214–15)

SUETONIUS. *De Vita Caesarum.* In *Suetonius.* Tr. J. C. Rolfe. London: Heinemann; New York: Macmillan, 1914.

NOTE: this work cited merely as a source of the remark by Julius Caesar quoted indirectly by JSM.

QUOTED: 749

SWIFT, JONATHAN. *Gulliver's Travels.* In *Works,* XII. Ed. Walter Scott. Edinburgh: Constable, 1814.

NOTE: this ed. in JSM's library, Somerville College. The references are all to the Houyhnhnms in Bk. IV. (JSM misspells the term as "Houyhnhms" in all cases (including the "Early Draft") up to 4th ed. [1856.].)

REFERRED TO: 32, 128, 137; *978, 1042*

TAINE, HIPPOLYTE. "John Stuart Mill et son Système de Logique," *Revue des deux mondes,* 2e ser., XXXII (1 March, 1861), 44–82.

NOTE: Taine purports to be reviewing a two-volume London ed. of 1859; presumably the 4th, of 1856, is intended.

REFERRED TO: 575n

TENNANT. Referred to: 428

NOTE: the reference is in a quotation from Herschel.

TENNYSON, ALFRED. "Oenone," in *Poems.* London: Moxon, 1833 [1832].

NOTE: this vol. (and Tennyson's *Poems, chiefly Lyrical* [London: Wilson, 1830]) reviewed by JSM in *Westminster Review,* XXX (July, 1835), 402–24.

QUOTED: 691

691.4 alone,"] alone. (63; 1, 245; *cf.* ll. 238, 247)

THALES (OF MILETUS). Referred to: 359, 361, 364–6, 761, 786

NOTE: one of the references at 364 is in a quotation from the reviewer of Tulloch; another is in a quotation from Preller; that at 761 (a quotation derived from Plutarch, *q.v.*) is in a quotation from Whewell.

THEMISTOCLES. Referred to: 937, 941

THOMSON, JAMES. *The Castle of Indolence: An Allegorical Poem.* London: Millar, 1748.

NOTE: the reference is to the poem as a whole.

REFERRED TO: 852

THUCYDIDES. *History of the Peloponnesian War*. Ed. C. Foster Smith. 4 vols. London: Heinemann; New York: Putnam's Sons, 1919–23.

NOTE: this ed. used for ease of reference.

REFERRED TO: 750, 828n

TIMOLEON. Referred to: 941

TOURNEFORT. Referred to: 700, 713, 793

NOTE: the reference at 700 is in a quotation from Candolle, within a quotation from Whewell; that at 793 is in a quotation from Paris.

TULLOCH, JOHN. *Theism: The Witness of Reason and Nature to an All-Wise and Beneficent Creator*. Edinburgh: Blackwood and Sons, 1855.

NOTE: Tulloch's essay actually took second prize in the second Burnett Prize competition.

QUOTED: 340, 369 REFERRED TO: 363–4, 366

340.23 "not . . . sequence,"] The belief [concerning succession], no doubt, is with them [the opponents of a mere sensational philosophy] of a very different character, and arises in a very different manner from that represented by Mr. Mill; but it is significant how, in the most earnest effort which has been made in our time to resolve the idea of causation into that of mere antecedence and consequence, there should be allowed to enter an element of belief which is confessedly not . . . sequence. (24–5)

VALENTIA. Referred to: 753n

VAN HELMONT. Referred to: 793

NOTE: the reference is in a quotation from Paris.

VARUS. Referred to: 941

NOTE: the reference is in a quotation from Stephen.

VASQUEZ. Referred to: 753n

VENN, JOHN. *The Logic of Chance. An Essay on the Foundations and Province of the Theory of Probability, with especial reference to its application to moral and social science*. London and Cambridge: Macmillan, 1866.

REFERRED TO: 547n, 630

VICO, GIOVANNI BATTISTA. *Principi di una scienza nuova.* Naples: Mosca, 1725.

REFERRED TO: 913

VIRGIL. *Eclogues.* In *P. Virgilius Maro Varietate lectionis et perpetua annotatione illustratus a C. G. Heyne.* 4 vols. London: Priestley, 1821, I.

NOTE: in JSM's library, Somerville College.

QUOTED: 346

346.8 erunt quoque altera] erunt etiam altera (I, 70)

VON HARDENBERG, FRIEDRICH LEOPOLD ("NOVALIS"). Quoted 843; see Carlyle, "Novalis."

WAKEFIELD. Referred to: 807

WARD, WILLIAM GEORGE. "Mr. Mill's Denial of Necessary Truth," *Dublin Review,* n.s. XVII (Oct., 1871), 285–318.

NOTE: a review of the 7th ed. (1868) of the *Logic,* and the 3rd ed. (1867) of *An Examination of Sir William Hamilton's Philosophy.* In the reference at 753n, Ward, citing F. Franzelin, is directly referring to the passage footnoted.

QUOTED: 576 REFERRED TO: 575–7, 753n

576.2 "transcendental considerations"] By introducing transcendental considerations, Catholics are able to prove conclusively this fundamental truth [that the laws of nature are uniform]. (311)
576.21 "the] Be it observed, that the (315)
576.22 and the] and that the (315)

WELLS, WILLIAM CHARLES. *An Essay on Dew, and Several Appearances connected with it.* London: Taylor and Hessey, 1814.

NOTE: the reference derives from Herschel's *Discourse.*

REFERRED TO: 414

WERNER. Referred to: 701

NOTE: the reference is in a quotation from Whewell.

WESLEY, JOHN. *The Journal of the Rev. John Wesley, A.M.* 4 vols. London: Kershaw, 1827.

NOTE: the reference occurs in a quotation from Paris.

REFERRED TO: 779–80

WHATELY, RICHARD. *Elements of Logic*. 9th ed. London: Parker, 1848.

NOTE: unless otherwise indicated, all references are to this ed., which JSM cites from his 3rd ed. (1851) on, though earlier references derive from the 1st ed. (London: Mawman, 1826), which is in JSM's library, Somerville College; when appropriate, references are given to both eds. It first appeared in the *Encyclopædia Metropolitana*, I. The quotations at 308n and 321n have not been located.

QUOTED: cxiin, 72n, 142n, 143, 185, 203–4, 308n, 321n, 744–5, 809–11, 814–15, 818–20, 820n, 821, 827–9 REFERRED TO: cxiv, 4 (*961*), 32n, 83 (*1007*), 85 (*1009*), 142 (*1045*), 166 (*1058*), 178n, 186n, 187 (*1068*), 195, 196, 206, 307–10 (*1106–7*), 431, 554, 801, 803, 804n, 814n

cxiin.4–7 "rules" . . . "of eminent service," . . . "must always be comparatively . . . Syllogism."] Such rules as I now allude to may be of eminent service; but they must always be, as I have before observed, comparatively . . . Syllogism; to which theory they bear much the same relation as the principles and rules of Poetical and Rhetorical criticism to those of Grammar; or those of practical Mechanics, to strict Geometry. (268)

cxiin.9–11 "brought . . . form," . . . "he . . . expects."] Supposing that some such system could be devised—that it could even be brought . . . form, (which he . . . expects,)—that it were of the greatest conceivable utility,—and that it should be allowed to bear the name of "Logic" (since it would not be worth while to contend about a name) still it would not, as these writers seem to suppose, have the same object proposed with the Aristolelian Logic; or be in any respect a rival to that system. (256)

72n.22 name . . . . The] name. Hence, first in poetical mythology, and ultimately, perhaps, in popular belief, Fortune, Liberty, Prudence, (Minerva,) a Boundary, (Terminus,) and even the Mildew of Corn, (Rubigo,) *&c.* became personified, deified, and represented by Statues; somewhat according to the process which is described by Swift, in his humorous manner, in speaking of Zeal, (in the Tale of a Tub,) "how from a notion it became a word, and from thence, in a hot summer, ripened into a tangible Substance." We find Seneca thinking it necessary gravely to combat the position of some of his Stoical predecessors, "that the Cardinal Virtues are Animals:" while the (1st ed., 299–300; 9th ed., 340)

142.n15–16 "explains . . . name;"] [*paragraph*] And any Definition which goes *beyond* a "nominal-definition," *i.e.* which explains . . . name, may be regarded, strictly speaking, as, so far, a "real-definition." (145)

143.9 a thing] the thing (145; 1st ed., 71, *from which JSM is here quoting.*) [*cf.* 143^{f-f}]

185.17–20 "merely . . . admitted,] Had he [Campbell] been aware that a Syllogism is no distinct kind of argument otherwise than in form, but is, in fact, *any* argument whatever,* [*footnote:*] *Which Dugald Stewart admits, though he adopts Campbell's objection. [*text:*] stated regularly and at full length, he would have obtained a more correct view of the object of all Reasoning; which is merely . . . admitted; —to contemplate it in various points of view;—to admit in one shape what he has already admitted in another,—and to give up and disallow whatever is inconsistent with it. (9th ed., 239; 1st ed., 216 [*without footnote*])

203.24–204.4 "In every . . . *sufficient* . . . conclusion; . . . *allowable* . . . class;"] [*paragraph*] But it is evident, and is universally admitted, that in *every* . . . "*sufficient* . . . Conclusion;"— . . . "*allowable*" . . . Class. (234)

744.25 "it must be] Nay, from the elliptical form in which all reasoning is usually expressed, and the peculiarly involved and oblique form in which Fallacy is for the most part conveyed, it must of course be (158–9)

744.27 one] *one* (159) [*treated as typographical error; cf.* 744.27 *below*]

744.27 any course of argument] any Argument (159; 1st ed., 137 *has JSM's reading*]

744.27 *one*] one (159) [*treated as typographical error; cf.* 744.27 *above*]
745.2 syllogism."] Syllogism; to the Sophist himself it is indifferent, as long as they can but be brought to admit the Conclusion. (159)
809.23 "One] [*paragraph*] One (177)
809.26 (or *conjugate*)] [or *conjugate*] (177; *Whateley's square brackets*)
809.28 corresponding] correspondent (177) [*cf.* 809^{c-c}]
810.11–12 *projectors* . . . trusted:] "*projectors* . . . trusted:"* [*footnote:*] *Adam Smith's *Wealth of Nations*: Usury. (177; 1st ed., 158, *has the footnote but not the quotation marks*)
810.15 former. This] former. [*paragraph*] This (178)
810.18–20 to . . . guilty:] "to . . . guilty:" (178)
810.21 *presume* and *presumption*] "*presume*" and "*presumption*" (178)
810.23 belief. There] [*1-paragraph omission*] (178)
810.26 of the meaning] of meaning (178) [*cf.* 810^{g-g}]
810.28 would] could (178) [*treated as typographical error*]
810.29 jest. [*paragraph*] The] [*2-paragraph omission*] (178–9)
814.29 *One, Identical*] "One," "Identical," (339)
814.30–1 one, as . . . object; being] one; (as . . . object); *viz.* it is (399; 1st ed., 299 *has JSM's reading*)
815.5 qualities.] qualities; else it would not be *he*. (339; 1st ed., 299 *has JSM's reading*)
815.7–8 degrees. Nothing] degrees. [*paragraph*] Nothing (339; 1st ed., 299 *has JSM's reading*)
818.36 angles . . . . There] [*ellipses indicates 2-page omission*] (194–6)
819.13 "Such] [*no paragraph; the quotation occurs in the passage omitted in the previous quotation*] (196)
820.8 "in] [Restricting ourselves to the main point, distinctness,] let us confine the name "*petitio principii*" to those cases in (1st ed., 179; *not in 9th ed., see JSM's note to the passage*)
820.11–26 proved." . . . "As] proved; (as (1st ed., 179; *not in 9th ed.*)
820.27 Holy Writ;"] Holy-writ;) and to the other class be referred all other cases, in which the Premiss (whether the expressed or the suppressed one) is either proved false, or has no sufficient claim to be received as true. (1st ed., 179; *not in* 9th ed.)
820.n3 "to] [*paragraph*] Let the name then of "petitio principii" (*begging the question*) be confined to (9th ed., 200; *not in* 1st ed., *see JSM's note*)
820.n5 addressing] addressing* [*footnote:*] *For of two propositions, the one may be the more evident to some, and the other, to others. (9th ed., 200; *not in 1st ed., see JSM's note*)
821.8 "Some] [*paragraph*] Arguing in a Circle, however, must necessarily be unfair; though it frequently is practised undesignedly; *e.g.* some (201)
821.9 lay] have laid (9th ed., 201; 1st ed., 180, *has JSM's reading*)
821.10–11 'because . . . heavier:'] because . . . heavier: (201)
821.12 but they] but still they (201)
827.37 We] I (9th ed., 212; 1st ed., 187, *has JSM's reading*
828.3 establish] establish.* [*footnote:*] *See Rhetoric, Part II. (212)
828.6 point. So] point. [*paragraph*] So (9th ed., 212; 1st ed., 188, *has JSM's reading*)
828.21 appeal] appeals (213)
828.25 "instead] [*paragraph*] For instance, instead (9th ed., 212–13; *this passage not in* 1st ed.
828.26 that the . . . atrocious:] that "the . . . atrocious:" (213)
828.27–9 that the . . . him, . . . that the . . . both:] that "the . . . him," . . . that "the . . . both:" (213)
828.29 that the poor] that "a man has not a right to educate his children or to dispose of his property, in the way *he thinks best*," you show that the way in which he educates his children, or disposes of his property is not *really the best*: instead of proving that "the poor (213–14)

QUOTED: 726n, 761–2, 798n REFERRED TO: cxiii, 284n, 294n, 342n, 652, 677n, 798n

761.8 philosophy.] philosophy.[1] [*footnote:*] [1]Plut. *Conv. Sept. Sap.* Diog. Laert. i. 35. (I, 37)
761.15 these;] these[2]; [*footnote:*] [2]Physic. Ausc. iv. 3 (I, 38)
761.18 described and] described or (I, 38)
761.26 result.] result, as we shall soon see. (I, 38)
761.27 Again,] Again[3], [*footnote:*] [3]Physic. Ausc. viii. 5. (I, 39)
762.2 "Another] [*paragraph*] Another (I, 40)
762.3 substances] substantives (I, 40) [*treated as a typographical error, and so does not appear in the text above*]
762.6 Aristotle] Aristotle[5] [*footnote:*] [5]Metaph. 1.5. (I, 40)
762.9–10 Oblong . . . . Aristotle] Oblong. We shall see hereafter, that Aristotle (I, 40)
762.14 this. In] this[6]:—In [*footnote:*] [6]Physic. Ausc. iv. 7. p. 215. (I, 44)
798.n5 'it] Thus, as it had been urged in favour of the geocentric doctrine that the heaviest body must be in the centre, it was maintained, as a leading recommendation of the opposite opinion, that it (I, 365)

——— 3rd ed. 3 vols. London: Parker and Son, 1857.

NOTE: formerly in JSM's library, Somerville College. See also 1st ed., cited above. All of JSM's quotations appear in both eds.; his own references (altered after Whewell's 3rd ed. appeared) are preserved, but for ease of reference the 1st ed. is also cited in the entries below. (In the title, the final word is "Time" in the 3rd ed., rather than "Times" as in the 1st.)

QUOTED: 798–9, 823

798.14–15 "they" . . . "would not allow," says Geminus, "of] According to Geminus, 'They [the Pythagoreans] supposed the motions of the sun, and the moon, and the five planets, to be circular and equable: for they would not allow of (I, 129; 1st ed., I, 165)
798.21 quickness or] quickness and (I, 129; 1st ed., I, 165)
798.36 "that] The Pythagorean tenet that ten is a perfect number,[7] [*footnote:*] [7]Arist. Metaph. i. 5. [*text:*] led some persons to assume that the heavenly bodies are in number ten; and as nine only were known to them, they asserted that (I, 52; 1st ed., I, 70)
823.12–16 "decides . . . do."] [*see* 762 *above, and entries for that passage* under 1st ed.] (I, 34; 1st ed., I, 44)

——— *History of Scientific Ideas: being the First Part of the Philosophy of the Inductive Sciences*. 3rd ed. 2 vols. London: Parker and Son, 1858.

NOTE: in JSM's library, Somerville College. This is the 3rd ed. of the Second Part of the *Philosophy of the Inductive Sciences* (i.e., not the 3rd ed. of the *History of Scientific Ideas*); *cf.* Whewell's *Novum Organon Renovatum*, which is the 3rd ed. of the First Part of the *Philosophy of the Inductive Sciences*. As JSM altered his references from the *Philosophy of the Inductive Sciences* to the *History of Scientific Ideas*, only the latter are given in the text, though his quotations are taken from the former source (as indicated by the accidentals, and such entries as those for 244.1, 699.12, 699.30, 718.19); in the collation below both sources are given. The quotation at 250 is in a quotation from Herschel.

QUOTED: 233, 237, 242–4, 247, 250, 699, 700–1, 717–18, 721, 725 REFERRED TO: 250, 292, 720, 722

233.18 "imaginary looking;"] If we arrange fifteen things in rows of three, it is seen

by looking, or by imaginary looking, which is *intuition*, that they may also be taken as three rows of five. (I, 140; *PIS*, I, 130)

237.5–6 proposition, there] proposition, yet if it be known merely by observation; there (I, 65; *PIS*, I, 59)

237.9 other . . . . Experience] [*ellipsis indicates 9-sentence omission with concluding paragraph break*] (I, 66; *PIS*, I, 60)

237.14 "experience cannot offer] Experience cannot, indeed, offer (I, 66; *PIS*, I, 60)

237.29 "Necessary] As I have already said, necessary (I, 58; *PIS*, I, 54, *JSM's original reference, has his wording*)

237.32 asserted. That] asserted. [*article 3*] That (I, 58; *PIS*, I, 54–5 *has only paragraph break*)

242.34 "No] [*paragraph*] Yet no (I, 264; *PIS*, I, 238)

243.12–13 "a . . . other;"] But we have seen that some of the most acute and profound mathematicians have believed that, for these laws of motion, or some of them, there was such a . . . other. (I, 263; *PIS*, I, 237)

243.14–15 "absolutely to pronounce" . . . "can . . . things,"] Whether the laws of motion, as we now know them, can . . . things, we have not ventured absolutely to pronounce. (I, 263; *PIS*, I, 237)

243.16 "Though] [*paragraph*] Thus, though (I, 240; *PIS*, I, 213)

244.1 once known; they possess] once fully known, they may seem to thoughtful men to possess (II, 25; *PIS*, I, 385 *has JSM's wording*) [*see JSM's next paragraph, which may have led to Whewell's version*]

244.3 *quality*] quantity (II, 25; *PIS*, I, 385)

250.8 No one probably] Probably no one (I, 217; *PIS*, I, 190) [*JSM is following Herschel's wording*]

250.9 on] upon (I, 217; *PIS*, I, 190) [*JSM is following Herschel's wording*]

699.3 [descriptive]] [*JSM's square-bracketed interpolation*] (II, 110; *PIS*, I, 464)

699.12 of the term] of this term (II, 110; *PIS*, I, 464 *has JSM's reading*)

699.15 of the kind] of this kind (II, 110; *PIS*, I, 464) [*treated as typographical error*]

699.30 resemblance were] resemblance to a butterfly were (II, 111; *PIS*, I, 465 *has JSM's reading*)

699.33 be no longer] no longer be (II, 111; *PIS*, I, 465) [*treated as typographical error*]

700.22 reform . . . . 'Tournefort,' says Decandolle,] Reform, of which we have spoken in the *History*. 'Tournefort,' says Decandolle[3], [*footnote:*] [3]*Theor. Elem.* p. 327. (II, 111; *PIS*, I, 465)

700.25 words] word (II, 111; *PIS*, I, 465) [*treated as typographical error*]

700.30 necessarily] successively (II, 111; *PIS*, I, 466) [*treated as typographical error*]

700.33 Necker.] Necker[3] [*footnote:*] [3]Decandolle, 329. (II, 112; *PIS*, I, 466)

700.34 present;] present[4] [*footnote:*] [4]For this Erhart and Decandolle use *Perigone*. (II, 112; *PIS*, I, 466)

700.37 *pinnatifid*,] *pinnatifid*[5], [*footnote:*] [5]Dec. 318. (II, 112; *PIS*, I, 466)

700.41 *bilobate*,] *bilobate*[6] [*footnote:*] [6]*Ib*. 493 (II, 112; *PIS*, I, 466)

701.3 *siliqua*,] *silica*[7] [*footnote:*] [7]*Ib*. 422 (II, 112; *PIS*, I, 466) [*cf.* 701[j–j]]

701.6 fern (Hymenophyllum Wilsoni) is] fern is (II, 112; *PIS*, I, 466) [*cf.* 701[k–k]]

701.8 spinuloso-serrate.'] spinuloso-serate[8].' [*footnote:*] [8]Hooker, Brit. Flo. p. 450. Hymenophyllum Wilsoni, Scottish filmy-fern, abundant in the highlands of Scotland and about Killarney. (II, 112; *PIS*, I, 467)

701.10 colours . . . . This] colours, as we have seen in speaking of the Measures of Secondary Qualities; to which, however, we must add, that the naturalist employs arbitrary names, (such as we have already quoted,) and not mere numerical exponents, to indicate a certain number of selected colours. This (II, 112–13; *PIS*, I, 467)

701.15 on . . . . Some] on, as we have already explained in the History of Mineralogy. Some (II, 113; *PIS*, I, 467)

717.7–8 "Natural . . . Definition,"] [*title of article 10*] (II, 121; *PIS*, I, 476) [*cf. entry for* 718.3 *below*]

717.9 "indefiniteness] And by reference to this principle as our guide, we shall be able to understand the meaning of that indefiniteness (II, 120; *PIS*, I, 474–5)
717.13 erect,] erect[17], [*footnote:*] [17]Lindley, Nat. Syst. p. 81. (II, 120; *PIS*, I, 475)
717.13 *stigmata usually*] *stigmata* are *usually* (II, 120; *PIS*, I, 475 *gives JSM's reading*)
717.16 and the stigmata] and of the stigmata (II, 120; *PIS*, I, 475)
717.18 Dr.] Mr. (II, 120; *PIS*, I, 475) [*cf.* 717[c–c]]
717.27 These] [*article*] 9. *Difference of Natural History and Mathematics.*—These (II, 121; *PIS*, I, 475)
717.30 may probably] may very probably (II, 121; *PIS*, I, 475) [*cf.* 717[d]]
718.3 Though] [*article*] 10. *Natural Groups given by Type not by Definition.*—The further development of this suggestion must be considered hereafter. But we may here observe, that though (II, 121; *PIS*, I, 476)
718.9 a Definition] Definition (II, 121; *PIS*, I, 476)
718.11 character] characters (II, 122; *PIS*, I, 476) [*treated as typographical error*]
718.13 arranged] ranged (II, 122; *PIS*, I, 477) [*treated as typographical error*]
718.19 to two] by two (II, 122; *PIS*, I, 477 *gives JSM's reading*]
721.23–4 general] To this [question concerning the regulative principle of classification] we reply, that the Condition which regulates the use of language, is, that it shall be capable of being used;—that is, that general (II, 100; *PIS*, I, 454)
725.16 in the time] at the time (II, 133; *PIS*, I, 489)
725.18 species. The] species. [*paragraph*] The (II, 133; *PIS*, I, 489)
725.20 names. Each] names. The artifice employed to avoid this inconvenience is to name a Species by means of two (or it might be more) steps of the successive division. Thus in Botany, each (II, 133; *PIS*, I, 489)

——— *The Mechanical Euclid, containing the Elements of Mechanics and Hydrostatics demonstrated after the manner of the Elements of Geometry; and including the propositions fixed upon by the University of Cambridge as requisite for the degree of B.A. To which are added Remarks on Mathematical Reasoning and on the Logic of Induction.* Cambridge: Deighton; London: Parker, 1837.

NOTE: the references at 227–9 and 231 might also be taken to refer to Whewell's *Philosophy of the Inductive Sciences*, where the same argument appears, I, 92ff.

QUOTED: 228 REFERRED TO: 227–9, 231

228.13–15 "a . . . thoughts,"] And thus it would appear, that a . . . thoughts. (149)
228.16 "those] No definition of straight lines could be employed in Geometry, unless it were in some way certain that the lines so defined are those (149)

——— *Novum Organon Renovatum: being the Second Part of the Philosophy of the Inductive Sciences.* 3rd ed. London: Parker and Son, 1858.

NOTE: in JSM's library, Somerville College. This is the 3rd ed. of the Second Part of the *Philosophy of the Inductive Sciences* (i.e., not the 3rd ed. of the *Novum Organon Renovatum*); *cf.* Whewell's *History of Scientific Ideas*, which is the 3rd ed. of the First Part of the *Philosophy of the Inductive Sciences*. As JSM altered his references from the *Philosophy of the Inductive Sciences* to the *Novum Organon Renovatum*, only the latter (except where a passage was deleted before the publication of *Novum Organon Renovatum*) are given in the text, though the quotations (as the accidentals indicate) are taken from the former source; in the collation below both sources are given.

QUOTED: 241–2, 294–5, 296, 651, 653, 656, 658, 672–4, 716, 725, 777 REFERRED TO: 241, 292, 293, 297–9, 305, 646, 647, 704, 705n, 845, 872n, 874n

242.6 truth. Yet] truth. [*article 4*] Yet (33; *PIS*, II, 174)
242.11 war . . . . So] [*ellipsis indicates a jump back of 1 page*] (33–2; *PIS*, II, 174–3)
242.11 So] [*article 3*] Indeed, so (32; *PIS*, II, 173)
294.21 combined . . . . When] combined. There is a Conception of the mind introduced in the general proposition, which did not exist in any of the observed facts. When (72; *PIS*, II, 213)
294.29 store] stores (73; *PIS*, II, 214) [*cf.* 294c–c]
295.3 "mere . . . circles,"] [*see* 294 *above*]
296.23–4 "who . . . life."] In Physiology, what a vast advance would that philosopher make, who . . . *Life*! (32; *PIS*, II, 173)
651.12 "*superinduce*"] *A new mental Element is* superinduced [*in Induction*]; *and a peculiar constitution and discipline of mind are requisite in order to make this Induction*. (II, v, Aphorism XV)
653.23 "clear" . . . "appropriate"] *Clear and appropriate Ideas.* (title of II, ii, 4)
672.30 "assumed] [*article 6.*] The result of such controversies as we have been speaking of, often appears to be summed up in a *Definition*; and the controversy itself has often assumed (35; *PIS*, II, 177)
673.4 "It] [*article 7, following immediately after the previous quotation*] It (36; *PIS*, II, 77)
673.6 imagine] suppose (36; *PIS*, II, 77)
673.17 of some] of any (36; *PIS*, II, 178)
673.24 by means] by the means (37; *PIS*, II, 178)
673.32 separated . . . . Definition] separated. Definition and Proposition are the two handles of the instrument by which we apprehend truth; the former is of no use without the latter. Definition (37; *PIS*, 178–9)
674.22 discovery . . . . To] [*ellipsis indicates 3-sentence omission before the first-quoted sentence*] (39; *PIS*, II, 181)
674.24 detected . . . When] [*ellipsis indicates 4-sentence omission; i.e., the sentence beginning* "When" *follows directly on the first-quoted sentence ending in* "discovery".] (39; *PIS*, II, 181)
716.23 rising] arising (286; *PIS*, I, lxxv) [*treated as a typographical error*]
725.2 were not] were, however, not (274; *PIS*, I, lxiv)
725.4 Order;] Order[12]: [*footnote:*] [12]*Hist. Ind. Sc.* b. xv. c. ix. (274; *PIS*, I, lxiv)

——— *Of Induction, with especial reference to Mr. J. Stuart Mill's System of Logic*. London: Parker, 1849.

NOTE: republished, with alterations, as chap. xxii, "Mr. Mill's Logic," of Whewell's *On the Philosophy of Discovery*. London: Parker and Son, 1860; the quotations and references are given under that title, below.

——— *On the Philosophy of Discovery, chapters historical and critical; including the completion of the third edition of The Philosophy of the Inductive Sciences*. London: Parker and Son, 1860.

NOTE: in JSM's library, Somerville College. Much of this work is an enlargement of Bk. XII ("Review of Opinions on the Nature of Knowledge, and the Means of Seeking it") of the *Philosophy of the Inductive Sciences*. Chap. xxii, "Mr. Mill's Logic," is a slightly modified version of Whewell's *Of Induction, with especial reference to Mr. J. Stuart Mill's System of Logic* (London: Parker, 1849); most of the references (those at cxivn, 203, 287n, 303, 305, 430–3, 503) and quotations (those at 88n, 235n, 287n, 300n–302n, 303–4, 321, 429–30, 499, 501, 502, 726n,

872n) are relevant to both these works, and in the collation below both references are given (those references in the text to *Of Induction* having been deleted). Although the reference at 203n is to the *Philosophy of Discovery*, and was added in 1862, the passage referred to is in *Of Induction*, 85. Also reprinted in the *Philosophy of Discovery* as Appendix E is Whewell's "Fundamental Antithesis of Philosophy," the quotations at 245 (2nd passage), and 247 are from it, but as JSM is not quoting from the earlier version, references to it are not given. The quotation at 303–4 is indirect.

QUOTED: 88n, 235n, 244n, 245, 247, 287n, 300n–302n, 303–4, 321, 429–30, 449, 501, 502, 504n, 726n, 872n, 929n REFERRED TO: cxivn, 203, 244–5, 287n, 303–5, 430–3, 495, 503, 928n–929n; *1111*

88.n2 except] unless (242) [Of Induction *reads* except (10)]
235.n3 "It] He [Mill] says, that "we know that the imaginary lines exactly resemble real ones;" and that we obtain this knowledge respecting the characteristic property of the idea of space by experience; though it (289; *Of Induction*, 84) [*for the quotation see* 234 *above*]
235.n4 ideas."] ideas; or why this property of their resemblance should be confined to *one class* of ideas alone. (289; *Of Induction*, 84)
244.n3 "that] In order to show that it is merely habitual association which gives to an experimental truth the character of a necessary truth, he [Mill] quotes the case of the laws of motion, which were really discovered from experiment, but are now looked upon as the only conceivable laws; and especially, what he conceives as "the *reductio ad absurdum* of the theory of inconceivableness," an opinion which I had ventured to throw out, that (287; *Of Induction*, 81)
245.7 "Some] [*section 9*] This doctrine,—that some (339)
245.8 yet the] yet that the (339)
245.8 and a] and (339) [*cf.* 245[u–u]]
245.8–9 attainment."] attainment,—I have not, it would seem, conveyed with sufficient clearness to obviate misapprehension. (339) [*Whewell is replying directly to JSM's criticism immediately above*]
245.11 "depends] But this inconceivableness depends (338)
245.24 "those of . . . contrary."] [*section 3*] One mode in which we may express the difference of necessary truths and truths of experience, is, that necessary truths are those *of . . . contrary*. (463)
247.17 "indifferently in any quantity;"] [*quotation not located, but the argument is similar to that on* 472ff., *esp.* 480–1]
247.23–4 "add . . . world,"] Yet we cannot derive from the senses our knowledge of a truth which we accept as universally certain;—namely, that we cannot by any process add . . . world. (472)
247.24 "neither] This truth neither (472)
247.26 truth . . . . When] truth. When the philosopher was asked what was the weight of smoke, he bade the inquirer subtract the weight of the ashes from the weight of the fuel. Every one who thinks clearly of the changes which take place in matter, assents to the justice of this reply: and this, not because any one had found by trial that such was the weight of the smoke produced in combustion, but because the weight lost was assumed to have gone into some other form of matter, not to have been destroyed. When (472–3)
287.n3 "is not the] [*paragraph*] Science may result *from* experience and observation *by* Induction; but Induction is not therefore the (245; *Of Induction*, 15)
287.n8 "not] [*section 4*] This distinction becomes of importance, in reference to Mr. Mill's doctrine, because he has extended his use of the term *Induction*, not (241; *Of Induction*, 8)
287.n13 "confusion of . . . tendencies."] [*section 6*] This confusion, (for such it seems to me,) of . . . tendencies, is expressed more in detail in other places [*in JSM's* Logic]. (241; *Of Induction*, 9)

300.n4 "Undoubtedly] I am obliged to say [in reply to JSM], Undoubtedly, (251; *Of Induction*, 25)
300.n7 done.] done[4]. [*footnote:*] [4]On this subject see an Essay *On the Transformation of Hypotheses*, given in the Appendix. (251; not in *Of Induction*)
300n.8 successfully] successively (251; *Of Induction*, 25) [*treated as typographical error, so does not appear in text above*]
300n.10 force . . . . When] force, as I have remarked in the History[5]. [*footnote:*] [5]B. vii. c. iii, sect. 3. [*text:*] When (251; *Of Induction*, 25)
300.n16 *Philosophy,*] *Philosophy*[6], [*footnote:*] [6]B. iii. c. ix. art. 7. (251; *Of Induction*, 25)
301.n20–3 "found . . . untenable." . . . "by a virtue,"] [*see* 300n *above*]
302.n12 "true . . . another"] [*ibid.*]
321.n3 "were] They were (246; *Of Induction*, 17)
429.21 "Upon] [*section 39*] Upon (263; *Of Induction*, 44)
430.7 "to] V. *His examples.*—41. If Mr. Mill's four methods had been applied by him in his book to (264; *Of Induction*, 46)
430.8 discovery, extending] discovery, well selected and well analysed, extending (264; *Of Induction*, 46)
430.9 science;"] science, we should have been better able to estimate the value of these methods. (264–5; *Of Induction*, 46)
430.10–11 "advantage" . . . "by] I have already ventured to say, elsewhere, that the methods which I have given, are as definite and practical as any others which have been proposed, with the great additional advantage of being the methods by (277; *Of Induction*, 66)
430.17–19 "takes . . . us."] [*see* 429 *above*]
501.14 these] those (274; *Of Induction*, 60)
502.28–9 "of . . . complicated."] Thus, when he [JSM] says ([2nd ed.,] ii. 22) that the condition of a hypothesis accounting for all the known phenomena is "often fulfilled equally well by two conflicting hypotheses," I can only say that I know of . . . complicated; and that if such a case were to occur, one of the hypotheses might always be resolved into the other. (271; *Of Induction*, 55–6) [*JSM retained the wording here quoted from Whewell, but the passage referred to was altered in* 65 *and again in* 68; *see* 500[d-d] above.]
504.n1–2 "which," he said, "we . . . weight."] (4) He [Hamilton] speaks of "a series of apparent fluids (as Light or its vehicle, the Calorific, the Electro-galvanic, and Magnetic agents) which we . . . weight." (331) [*i.e., JSM is quoting Whewell's quotation from Hamilton.*]
504.n3 "To] [*paragraph*] To (331)
504.n7 proved."] proved; and the proof is not shaken by denying the conclusion without showing any defect in the reasoning. (331)
726n.3–4 "stopped . . . beings," . . . "thought . . . philosophy."] On this I have to observe, that I stopped . . . beings, because I thought . . . philosophy; and that I sufficiently indicated [in the *History*] that I did this. (270n; *Of Induction*, 54n)
726.n7 "a] In the *History* (b. xvi. c. vi.) I have spoken of the doctrine of Circular Progression propounded by Mr. Macleay, and have said, "so far as this view *negatives* a (270n; *Of Induction*, 54n) [*this sentence follows immediately on the one last quoted*]
726.n8 contact only with] contact with (270n; *Of Induction*, 54n) [*in Whewell's* History, *from which he is quoting himself, the wording is as JSM gives it* (III, 353–4)]
929n.18–19 "discussions concerning ideas"] All discussions concerning ideas, M. Comte would condemn as "metaphysical," and would consider as mere preludes to positive philosophy. (227)

——— *The Philosophy of the Inductive Sciences, Founded upon their History*. 2 vols. London: Parker, 1840.

NOTE: see also Whewell's *History of Scientific Ideas*, 1858 (which is the 3rd ed. of the First Part of the *Philosophy of the Inductive Services*), *Novum Organon Renovatum*, 1858 (which is the 3rd ed. of the Second Part), and *On the Philosophy of Discovery* (a great part of which is a rewriting of Bk. XII). As JSM altered his references to conform to these later volumes, the references to the *Philosophy of the Inductive Sciences* which are also to these volumes do not appear in the text; however, they are given, where appropriate, in the collations to those volumes. The quotation at 658n appears in *Novum Organon Renovatum*, 43, without the second example. The quotation at 822n appears in *On the Philosophy of Discovery*, 199.

QUOTED: 53, 658n, 707, 822n REFERRED TO: 150, 228 (see also Whewell's *Mechanical Euclid*, references to 227–9, 231), 284n, 294n, 301n, 394n, 651n, 713n; *1119*

53.30 "*merely* . . . mind,"] When we say that the conceptions of straight lines and circles are *merely* . . . mind, we rather increase, than diminish, the difficulty of understanding how these states of mind, and no other, make the whole body of geometrical knowledge possible. (I, 40–1)

707.12–13 "Aphorisms concerning the Language of Science;"] [*title of a section of the Preface*] (I, xlviii) [*in* Novum Organon Renovatum, *running title of* Bk. IV, pp. 257ff.]

WILLIAM I (OF ENGLAND). Referred to: 941

NOTE: the reference is in a quotation from Stephen.

WOLLASTON. Referred to: 389, 428

NOTE: the reference at 428 is in a quotation from Herschel.

XERXES. Referred to: 333n

YOUNG. Referred to: 502

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References are given to those Appendices that contain portions of the text in earlier versions; these references are in italic type. When passages in the Early Draft parallel passages in the final text, the references to the former are given in parentheses immediately after the references to the latter. Volume VII contains pages 1–638, and Volume VIII pages 639–1251.